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SEA-SIDE HOMES: AND WHAT LIVED IN THEM.

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MILE after mile of sloping sea-beach occupies the front of a low island on the Carolina coast, and contends, along a foamy line, against waves that ceaselessly advance, to be continually repulsed; a sea-front flanked with sand-works blown by the wind into tumuli over the trenches, where lie buried countless shells that will only come to light again as fossils, when the books of to-day, and those who wrote them, have become indistinguishable dust; beyond which there is a vast bed of oozy mire hidden by the rank growth of reeds that rustle and surge with every breath of wind. Among the sand-mounds, defended by these buttresses alike from the open violence of the sea and the insidious approach of the marsh, are sequestered spots, bestrewn with shells, carpeted with slender grasses whose nodding spears trace curious circles in the sand about their roots, with here and there a half-buried vertebra of a stranded whale, or the rib of some ill-fated vessel, telling a tale of disaster by sea,—spots so secluded that the measured cadence of the wave-beats, confused by this and that avenue of approach, only enters with an inarticulate murmur. Here is the chosen home of

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two beautiful birds that come and pass the summer months together; a peaceful home, secure, it would seem, from danger of whatever sort; a house that falls not when the rain descends, and the floods come, and the winds blow, though it is built upon the sand. Alas! that even were it founded upon a rock, the gates of ornithology should prevail against it.

It is late in May—the last week of a month that is not, in this warm climate, “a pious fraud of the almanac,” as it is in New England—and the birds are busy now. Six weeks ago they came from their winter retreat in the far South, to this well-remembered spot. The Least Terns came dashing along high in the air overhead, their pearly white forms wavering between the blue water and the bluer sky, ruling both and uncertain which to choose; and saw, with cries of exultation, the end of their long journey. As swiftly, yet more secretly, the Wilson’s Plovers flitted along the shore, half concealed by colors that repeat the hue of the sand, from one headland to another, across gulf and river’s mouth in succession, till they too greet their homes with joyous notes. Separated for a long interval, or at most little heeding each other, the Terns and the Plovers are to come together again, and rear their young under the shadow of each other’s wing. While they are flashing through the clear air, or skimming lightly over the mirrored beach, and occupied, after mutual recognition, each in their own way with the preliminaries of the great event of their lives, let us see what manner of birds they are. Then, when we come to look in upon their homes we shall not be visiting strangers.

The Least Tern is, as its name implies, the smallest bird of its kind in our country; but it has several near relatives in other parts of the world; cousins so nearly alike that they have often been mistaken for each other. They form a race, or “subgenus,” as the naturalists call it, that is distinguished from other Terns by diminutive size and dainty form, even among a class of birds all of which have ex-

quisitely moulded shapes, and by a crescent of pure white on the forehead, sharply defined in the jetty black of the rest of the crown. They are delicate pearly-blue above, with snowy-white under-plumage, that has an indescribably soft and silky lustre; the long-pointed outer primaries, that cleave the air so deftly, are black, silvered with a hoary gloss of exceeding delicacy; the bill is bright yellow, tipped with black; the feet are of the same color, and are likewise tipped with the black claws. The little bird of our country answering to this description, has a variety of names in and out of the books. In many places it is called "Striker," from the way it has—after hovering in the air, its slender bill pointed straight downward, its clear eyes intently surveying the water below, and at length fixing upon some unlucky shrimp or minnow—of dashing impetuously down to secure its prey beneath the water; and just possibly, its scientific name, *Sterna*, as well as the English derivative, *Stern*, or *Tern*, may be traced to a classic root (seen in *sterno*, "to strew or scatter," and also "to throw down") and have its origin in this same habit. A more apt and elegant designation is that of "Sea-swallow," by which this and other species are universally known. They are all, indeed, swallows of the sea, replacing over the waters those familiar birds of the land, and having many features in common. Popular language has, as usual, caught the idea of these striking points of resemblance, and caged it in an expressive word. Even the written history of this bird's names is not devoid of interest; for a study of the various words unfolds a story of human thought. Thus our forefathers in ornithology called the bird the Least Tern (*Sterna minuta*), because they did not know it was different from the European species of that name; but it is, nevertheless, for the pearl-blue extends over the tail instead of being confined to the back and wings, and the size of the bill, and of the white crescent, are not the same in the two species. Nuttall gives it as the Silvery Tern (*S. argentea*); a pretty name, and one very suitable,

but founded upon the wrong premise, that our species is the same as one that lives in South America. When Dr. Gambel found out that it was different from both these species, he bestowed upon it the title of the Bridled Tern (*S. frenata*), another very distinctive name, that would be well applied, were it not for the fact that M. Lesson, a French ornithologist, had previously called it the Antillean Tern (*S. antillarum*), because it is found in those islands in the winter. So we have no choice in the matter of a scientific name, in which there is not the same license as in the case of our common designations. But let the latter be as various as they may the little bird is always the same. It spends the winter in Central America and about its islands; when spring opens it courses northward to visit us; a few extend along the Pacific Coast, some up the Mississippi and its tributaries, almost to their very sources; and more along the shores of the Atlantic. Some of the latter go as far as New England, but there are attractions all along, and detachments drop off by the way, stopping here and there, till the ranks are fairly decimated before the most adventurous birds make their final halt. But "their tricks and their manners" are pretty much the same under all circumstances, and what these are we shall presently see.

A very different bird is Wilson's Plover; a wader, not a swimmer; as they say, in words as long as the bird's legs, a grallatorial, not a natatorial, species; which simply means that the little bird is content to run along the sand and dabble with bill and feet, in the wavelets, instead of boldly dashing in among the breakers, like a Tern, for instance. It belongs to a genus well-named *Egialitis*, which signifies a "dweller by the sea," and has never been known to forfeit its right to the name. We have several other species of the same group. The commonest and most widely diffused of these is the "Killdeer," that everybody knows throughout the length and breadth of the land; the Ring Plover and Piping Plover are two others, familiar to all New England-

ers. Wilson's is characteristic of the South Atlantic coast; it only incidentally, as it were, strays northward as far as Massachusetts, and is, consequently, the least generally known of the four kinds; but once seen it can never be mistaken afterward. It is smaller than the Killdeer, but larger than either the Ring-necked or the Piping Plover, to which it is very similar in coloration, if not in the precise tint. The under parts of all three are white; the upper parts of Wilson's are much darker than those of the Piping, and yet a trifle lighter than those of the Ring Plover. A collar of pure black crosses the white of the breast; a crescent of black occupies the crown between the eyes, separated from the bill by the white forehead; on the nape and sides of the head the grayish brown merges into a clear warm buff. This, it must be remembered, is only the nuptial plumage, and of the male bird; the latter, at other seasons, and the female at all times, have these black bands replaced by buffy brown; and this is the plumage in which the bird is oftenest described. But the greatest peculiarity remains to be noticed. Wilson's Plover has a very large entirely black bill, while both the Ring and the Piping have a very small bill, orange yellow at the base, tipped with black. For the rest it wants the bright-colored circle around the eyes, formed by the margin of the lids, that the other species display during the breeding season. Its eyes are clear brown; its legs livid flesh colored, and longer than those of the others; it is not half-webbed like the Ring Plover—only about as much so as the Piping. Its large black bill gives it a singular expression, and undoubtedly corresponds to some difference in the nature of its food, if we could only find out exactly what. Such is the bird that hurries along the coast from the South in April. Upon their arrival they gather in small flocks, of from half a dozen to a score or more, and ramble over both the clean sea-beach and the muddy flats in search of food, sometimes straying into the adjoining salt-meadows if the grass be short and scanty enough not to

impede their way. They are naturally gentle and confiding birds, thinking no evil, and prone to take others to be as peaceable and harmless as themselves; but they have only too often to learn wisdom by saddest experience of broken limbs and maimed bodies, and to oppose treachery by wariness and caution. In the spring, if not at other times, they have a note that is half a whistle, half a chirrup, and sounds very different from the clear mellow piping of either of their nearest relatives. After a little while spent in recuperating their energies after their long flight, in putting on their perfect dress, in sham fights and ardent pursuits along the strand, more pressing duties call them from the water's edge to the recesses of the sand-hills. There we shall find them "at home," no longer in flocks but in pairs, and keeping house with the Sea-swallows.

The spot is indicated by the fleecy cloud of the Terns flecking the air overhead. We toil on over beds of loose dry sand, in which our feet sink and slip backward, and gain the recess among the mounds. The ground is here more firm and even; the wind has swept it clean of superfluous sand, and piled up the sweepings here and there in odd nooks; the rains have packed it tight and washed every shell and pebble clean. The most careful housekeeper in the world could make her home no more tidy than the wind and rain have made this shelly dwelling-place of the Terns and Plovers. As we walk on, we see that other visitors have been before us, each one leaving its "card" engraven on the fine sand. Here goes a curious track straight up and over a sand hillock, as if half a dozen little animals had ran a race one after the other, on stilts, the points of which pricked into the sand and formed a band of indentations four or five inches broad. These are the footprints of only one creature, however,—the sand-crab, a curious little fellow, with a square body, and eyes upon the ends of two poles that stick straight out when wanted for use, and shut into the shell like the blades of a pocket-knife, when their owner goes to

sleep,—a singular crab indeed, mounted upon a wonderfully long set of eight legs (to say nothing of two claw-nippers), all of which he contrives to move at just the right moment, as if he were playing a tune upon piano keys, and so plays himself sidewise over the sand with marvellous ease and celerity, the only wonder is that he does not forget a leg in his haste. He is a very grallatorial crab, and lives in the holes in the sand we see all about, just like a prairie-dog. There is a tortuous trail along the sand, where a water-snake, perhaps a *Nerodia sipedon*, crawled out of his pool in the marsh beyond, to enjoy the sun's rays, or possibly on an eggging expedition like ourselves. Here is a fainter line, straight as an arrow, looking just as if a pencil had been drawn along a ruler's edge; it is the mark left by the long slender tail of the little striped lizard, and if we look closely we shall see it bounded on either side by a succession of faint dots where the creature's toes barely disturbed the grains of sand. There again is a curious track, a pair of rounded depressions, side by side, and hardly more than an inch apart, outside of which, in the intermediate distances, are another pair, wider apart, and much longer. It is clear that a Marsh Rabbit has passed this way, planting his fore-feet straight downward, and drawing his hinder ones leisurely after, half squatting at each step, as he loped out of his home in the bushes to nip the beach grass for a change of diet. And so we might go on reading signs as plain as print; but the birds are by this time alarmed as they never were by former visitors. They know by intuition that we are not one of them, though among them, and that our coming bodes no good, however much we may affect to care for them in an abstract way. So in a moment all is changed, and confusion reigns where were peace and quiet. The quick-witted Terns were the first to sound the alarm; they had watched our approach, and straightway changed their heedless and joyous cries to notes of anger and fear; at the signal the sitting birds had arisen from their eggs and

joined those already overhead. The male Plovers, off foraging for insects and minute sea-creatures, surprised at the noise, had come hurrying home, only to have their worst fears confirmed, and be met half-way by their terrified mates, who had stolen quietly from their nests when the Terns deserted theirs, instinctively looking for comfort and protection where it had never been denied before. It is a strange sight, and a mournful one, already too painful to be wholly interesting, and the tragical end has not come yet. The Terns seem not to know what fear is; they dash about our heads, plunge as though to strike us, recede a little, approach again, always keeping in a cloud above us; and from every throat come notes of anger and fear and beseeching combined; a very Babel of tongues. The Plovers are more timorous; they are flitting to and fro, low over the sand, at a little distance, in anxious groups of three or four, with indescribably touching appeals for mercy to spare their homes; now alighting and squatting in hopes they are still undiscovered, and again running swiftly along, too frightened for a moment's rest. A dark day indeed for the poor birds! Bird's-nesting is a sad business, at best; it makes little difference to the birds, it is to be feared, whether their eggs are stolen by school-boys, to be played with and forgotten before the Saturday afternoon is over, or by grown up people to make books with, and be kept thereafter in cabinet drawers. What difference there is, seems to be that the boys let the old birds off altogether, and are satisfied with robbing the nests; while the larger children rob and then shoot the parent birds, to "authenticate the specimens."

Where are the eggs? Here, there, and everywhere about the sand lie the Tern's, till we are in danger of treading on them unawares. There are not so many of the Plover's, though still plenty for our purpose; but both kinds are nearly of the same color as the sand, and their markings conform to the unvarying variegation of color of the shelly strand, so that it is an easy matter not to see them, even

when looking straight at them. Here is a set of Plovers' eggs, and there, not a yard off, one of Terns'; we may sit down and examine both together. It may be best, however, after noticing carefully the nests and their surroundings, to gather a lot of each kind of egg, and carry them home with us for more particular examination.

Properly speaking there are really no "nests" in either case. Neither the Tern nor the Plover has any architectural instinct, because none is needed. Both lay their eggs in a slight hollow in the sand, about four inches in diameter; but even this hollowing is sometimes scarcely appreciable, and the eggs seem as if dropped by accident on the ground. It is probable that at first no hollow, or only the slightest one, is made; and that subsequently the depression becomes better defined by the movements to which the eggs may be subjected, and the weight and motions of the parent birds or young. In some instances there is a difference between the two kinds of nesting-spots, happening thus: the Plovers sometimes lay in a scanty tuft of slender straggling grass, which was not done by any of the Terns, at this breeding-place; and again, the Terns frequently line the depression with little flat bits of shell, which the Plovers have not been observed to do. Sometimes the pieces of shell seem to have been lying there before, and thus only to have been used as a nest-lining by accident as it were; in other cases the regular disposition of the fragments in a circle, leaves no doubt that they were carefully arranged by the birds. This method of making a shell-nest is just like that of the Auks and Guillemots, that breed in cracks in the rocks, and raise a little platform of pebbles to keep their eggs from the wet; and is, doubtless, for the same purpose,—to defend the eggs from whatever moisture might be in the sand. Still, of two Terns' nests, side by side, one may have the shells, and the other be without them, or at least not have them specially arranged. Neither bird uses any dried grasses,

sea-weed, or other soft pliable substances, in this particular locality at least.

The number of eggs deposited must next claim our attention; and in this matter, as seeing is believing, we must differ with some very respectable authorities. It is a common belief, circulated from one writer's book to another's, that Terns generally lay three eggs, and the little Sandpipers and Plovers always four. The belief is true enough, as a general rule; but every rule has its exceptions, and here are two notable ones. The Least Tern, breeding in North Carolina, generally lays *two* eggs; sometimes only *one*; rarely (if ever) three; and never four; at any rate, we have not found more than two in any instance, and our experience may count for something, seeing that we have just explored a tolerably extensive breeding place. Still it would be injudicious for us to proclaim that the bird may not lay three in other localities. But as for four eggs from one Least Tern at a single laying we flatly refuse to believe it till we see it. If any one is inclined to object to the assertion that the *one* egg, found in some instances, would have been succeeded by another, we can discountenance the assumption by replying that the solitary eggs in question were nearly hatched when found. Again, Wilson's Plover lays three eggs,—no more, no less, as far as our observations have gone, with respect to nests actually found. The suggestion that the fourth one would have been laid in due time is combatted by what has just been advanced in the other case, namely, the mature condition of the embryos. Yet we know the bird sometimes lays four, because we have killed females just going to lay, finding one egg in the oviduct, almost ready to be expelled, and the three others in a highly developed state, still attached to the ovary. The time of laying varies a great deal, in the cases of both the birds. They may deposit eggs at any time between the second week in May and the first in June; the greatest number lay about May 20th. Some of the Terns may even commence

earlier, as young birds, already quite strong of wing, are to be seen flying about by the 20th of June. Early in the latter month, nearly fresh eggs, eggs nearly hatched, and newly fledged young, of the Plover, may all be observed. These little nestlings are very pretty and very curious specimens of early birdhood; they can run quite cleverly over the sand as soon as fairly dry from the egg, if not "with half a shell on their backs," as is popularly supposed to be the case with young partridges; and are rather difficult to find, from their knack of hiding, like their parents, by squatting closely on the sand. Their legs seem disproportionately long, like a young colt's. They have black bills, like their parents, from the moment of birth. They are covered all over, except a little space on the neck, with woolly down, that is white below, and beautifully variegated with black and buffy brown on the upper parts. The newly fledged Terns are very different from the old ones, being curiously mottled above with different colors, in which the pearl-blue scarcely shows; without a black cap, the head being white, except some slaty feathers over the ears and nape; the bill blackish, and the feet dull-colored, and the tail much less forked. They cannot be mistaken for any other species, however, for there are none so small as they.

We have now only to examine the eggs we have collected; and here again we must give the specimens themselves precedence over authorities. If Nuttall, for example, had had ours before him when he wrote of the Least Tern, we should not now read in his Manual, that "the eggs, three or four in number . . . are about one and a half inches, by three-quarters of an inch in breadth." Ours, we see, are considerably smaller than this, and of a different shape from that implied by these dimensions, averaging only 1.25 inches long, by just 1.00 in breadth. The longest and most pointed one is 1.30 by 1.00, the shortest and roundest 1.20 by .98; these measurements probably representing very nearly the extremes of variation. The ground color

varies decidedly; the differences may be reduced to two kinds, in one of which the color is very pale clear greenish-white, and in the other pale-dull drab or olive whitish, the latter apparently due to the mixture of a little brownish in the green. These colors are speckled all over with small splashes, irregular spots, and dots, of clear brown of several shades; and others of a paler, illy-defined, somewhat lilac, hue, appearing as if it were brown *in* the shell, instead of on the surface. The markings are often very evenly distributed over the whole egg, but more frequently, perhaps, tend to form a circle, at or around the larger end, particularly in those cases where they are large and splashed. The point of the egg is often free from markings, or with only a few small dots.

The Plover's eggs are of the same general pattern of coloration as the Terns', but are larger, and otherwise conspicuously different. The variation, both in size and shape, is very considerable; thus one measures 1.45 by 1.05, and another only 1.22 by 1.00; a variation not only of absolute size but also of relative length of the long and short axes, resulting in a very decided difference of shape. All agree in having the greatest short diameter near the large end, as usual among birds of the order, and the difference is mainly due to a greater or less elongation and pointedness of the smaller end. The shorter axis varies only within narrow limits; but even in eggs taken from the same nest a difference of .15 may be observed in the lengths of the long axes, with, of course, a corresponding discrepancy in contour. The ground color is difficult to name; it may be called pale olive-drab, more decidedly inclining to a greenish hue in some, and to a brownish in others. The eggs are thickly marked all over with brown so dark as to be almost black; the markings are in irregular, sharply defined spots, small splashes, and fine dots. In some specimens the markings show a tendency to run into fine lines, and in these are smallest, darkest, most numerous and most sharply outlined;

but ordinarily the distinctive splashed character is maintained. Commonly the markings are rather larger, and, consequently more thickly set on the larger part of the egg, where there is also some tendency to run together, though scarcely to form a ring around the butt; but in none of the specimens examined was the pointed end free from spots. Here and there may usually be observed a few pale obsolete spots, as noticed in the Terns' eggs, but they are fewer and much less conspicuous, and in fact are hardly to be detected without close scrutiny.

RAMBLES IN FLORIDA.

BY R. E. C. STEARNS.

PART II.

THE trip across Florida, from the Atlantic Ocean to the Gulf of Mexico, is made by railroad. Rising with the birds and eating an early breakfast, a ten minutes walk takes us to the depot, which is about a mile from the hotels. There is no commotion or hustling, no noise of many hackmen nor crowding of passengers, neither any difficulty in finding a seat; a single car is sufficient to accommodate the few persons that have occasion to travel. Of the small number, probably one-half will stop at stations by the way; the principal business of the road is the transportation of freight, and were it not for the extensive business in the forwarding of merchandise, consisting of cotton, rosin, sugar, lumber, etc., on account of the steamship connections which form, together with this road, a through line from New Orleans to New York, by which much time is saved compared with the other routes, it would, doubtless, prove unprofitable to its proprietors.

The ride from the Ocean to the Gulf absorbs nearly a day, for it will be supper time when we reach Way Key. The

landscape is exceedingly monotonous, and the journey somewhat tiresome; nevertheless, it affords an opportunity for observation, and a very fair idea of the general character of the country can be obtained. There are no pretty villages with neat houses and bright garden patches to please the eye; a few shabby towns are passed through, or stopped at for a moment to discharge freight or to allow a brace of passengers to get off or on. Away from the sad looking villages, an isolated cabin or a cluster of huts occupied by tar and rosin makers are passed by. The forest scenery has neither tropical beauty nor the grandeur of the pineries of Maine, Michigan or California,* which so impresses the beholder; the prevailing timber is the *Pinus palustris*, or pitch-pine; the trees are not above medium size and stand many paces apart; hundreds may be seen whose sides are defaced by the rough scars or notches made by the ruthless axes of the pitch gatherers, and some trees have many of these wounds. At one place there is an extensive establishment for the distillation of the spirits of turpentine, which employs several persons; at other points saw-mills may be seen. The products of the pines are the prime fountain of revenue to the inhabitants of the neighborhood for many miles along the line of the railway.

Here, as elsewhere within the territory of the United States, the pine tree and not the palm, contributes wholly, or in part, to the maintenance of large communities, and although the palms, by their fruits, furnish the chief subsistence for a large portion of the inhabitants of the torrid zone, and entire tribes of men in the valley of the Orinoco live for several months in the year on their fruits, yet it is undoubtedly true that a much greater proportion of the population of the globe are indirectly supplied with their daily

*In comparison with tropical forests, the magnificent tree ferns, the arborescent grasses, the delicately branched mimosas, and the loftier of the palm forms are wanting; there are none of the *Palmeae* here that attain a half of the height (182 feet) of those mentioned by Humboldt; neither can be seen those giants of the *Coniferae*, the monarchs of the forests of more northern latitudes, the Redwoods (*Sequoias*) and Pines, some of which measure over 300 feet.

food through the generous bounty of the pines than by any other of the forest tribes; yet, perhaps, the voluptuous beauty of the palms has inspired the poetic muse more frequently than the sedate bearing and sturdy merits of the noble pines; the *Artocarpus incisa* is no more the "tree of bread" to the naked natives of the South Sea Islands, than is the pine tree to a greater number of civilized and refined people. But each is glorious in its way!

The sallow and sickly faces of many of the people hint strongly of fever and ague. The small size of the cattle shows that the country is overstocked, or that the pasturage is limited and poor; the milk used in the so called hotels is the condensed milk from the North; the butter is imported, and the beef is stringy and dry; most of the corn used, at least in this part of the state, is brought from abroad, and the country does not produce the wheat that the people consume. Few fruit trees are seen from the car windows; an occasional orange or peach tree is therefore noticed. We are informed that this is not a fruit region, but that in the vicinity of the St. John's River, and in that part of the state, the orchards are large and numerous.

The stranger is impressed by the general flatness of the country; nothing like an embankment or an excavation upon the line of the road can be seen. The surface is never more than very slightly undulating, and is covered with sand, except in such places as are wet or swampy. After a rain every depression becomes a pool or lake, to be in time absorbed by the sand or evaporated by the sun; as the elevation of the land is but little above the sea, the process of draining the surface by the sinking of the water must be exceedingly slow. The topography may be better understood, perhaps, when we consider that South Florida is but a succession of beaches piled up by the sea, a superstructure of shore debris resting upon ancient coral reefs.* This

*Though previously aware of the structure of Southern Florida, we were surprised to discover the ancient reef formation extending so much farther to the north than we

is confirmed by the outcroppings of the old reefs, that, projecting from the ground, are visible at various points by the side of the road. In addition to the accumulation of sands portions of the state have undoubtedly been, and perhaps are still being gradually elevated.

Agassiz estimates that not "less than seventy thousand years have elapsed since the coral reefs already known to exist in Florida began to grow."* What the area of the state may be seven hundred centuries hence we can only conjecture. The same agencies are still in active operation. It will, probably, extend much farther in a southerly direction, and the southern part of the state will be greatly widened toward the west. Those insignificant (so far as size is considered) but persistent workers, the reef-building masons, the *Astræans*, the *Meandrinæ* and the *Porites*, are coöperative workers at the present time as during the centuries that have passed.† Deep in the sea the foundations of future reefs are being laid, upon which the more ornamental coral-workers, the *Madrepores*, will attach their snow-white shrubbery, fringing the surfaces and edges with beautiful forms, an elaborate and graceful finish to otherwise substantial structures.‡

The few tree Palmettos or Cabbage-palms (*Chamærops palmetto*) that we have already met, indicate that we are approaching the Gulf; as we move along the number increases, and numerous fine specimens are seen.

had been led to infer from anything we had read on the subject. We could find no evidence that the reef-builders at the present time, upon either coast of Florida, are working upon so high a northern line; this may be owing to a decreased temperature, an increased freshness, the greater impurity of the water, or to a combination of these causes.

*Methods of Study in Natural History. p. 189.

†"Ehrenberg judges that certain enormous corals which he saw in the Red Sea, and parts of which are still tenanted by working polyps, were alive in the time of the Pharaohs, and have been growing and enlarging ever since." (Grindon.)

‡"The red coral of commerce (*Corallium rubrum*) so much admired for its brilliant color, and the high polish of which it is susceptible, adapting it for making beads and other trinkets, etc., forms a very profitable trade in the Mediterranean where it is chiefly found. It is procured by dredging and diving, and its fishing gives employment to numbers of people." (Baird's Dictionary of Natural History, p. 35.)

Here the road runs through wet and swampy ground, with lagoons and stagnant water upon the right and left. The sun bade us "good night" nearly an hour ago, and objects not distant are indistinct in the dusk of the twilight. Presently the train moves more slowly, and looking out we see the twinkling of lights; like a boy travelling in a lonesome place the locomotive whistles, but with the vim of a thousand fifiers, and then comes to a halt. Out we get into the darkness and look around; sand is under our feet, and a scanty show of vegetation, principally coarse wiry marsh grass, is about us, and the air is chilly. With a benediction upon the inventor of overcoats, we wrap ourselves closely, and realize that a fireside would be more comfortable than the open air; so with a negro for a guide we start for a public house, to await the dawning of another day before farther spying out the pride or nakedness of the land.

Way Key is one of a group of islands known as Cedar Keys; it is of small size, irregular outline, and for the most part sandy and low, though in some places marshy and wet. Here, as at Fernandina, the railroad company have made extensive improvements, by the erection of a large freight-house, and a substantial wharf for the accommodation of steamers that touch here en route to and from New Orleans, Key West and Havana.

The town consists of a few buildings, not remarkable either for architecture or workmanship, and the hotels are a practical joke upon the traveller. From the end of the railroad wharf, the disciple of Izaak Walton can enjoy his favorite pastime by catching trout, which are plenty, and fine fat oysters abound in the neighborhood. Were it not for the fishes and oysters the fare at the taverns would be wretchedly mean.

The scenery, as viewed from the long wharf, is attractive; other islands of the group being quite near. The "old town," as it is called, is much better located, in point of elevation, than the recent one. It is built upon an island

directly opposite from the principal wharf, and presents a pleasant appearance; beyond is the lighthouse, situated upon an eminence on Sea-horse Key. Sea-horses are, probably, the only horses in or about Cedar Keys, for at Way Key the sole beast of burden, at the time of our visit, was a poor cow,* which, harnessed into a dray, was forced to do the hauling for the place. What a commentary upon the progressiveness and business enterprise of a community! Our regard for the sex made us indignant at beholding the degradation of the patient brute.

At the south end of Way Key there is a group of mounds of unusual size and elevation; the largest and most southerly presents an abrupt face to the beach, having been partially dug away. Its height, as seen from this point, cannot be far from twenty-five feet: it was, probably, before being disturbed, not less than thirty feet; but this, as well as others of the group was, like the larger mound near Fernandina, used for military purposes during the recent war. The aggregate thickness of the shell strata with the intercalated seams of ashes, upon the southerly side of the principal mound, and directly facing the sea, is about twenty feet, and composed principally of the valves of Oysters (*Ostrea Virginica*), while on the north side of the same mound the shell deposit is somewhat less in thickness, and largely composed of the valves of Scallops (*Pecten dislocatus?*). But it must not be understood that the above are the only species of shells found here, for numerous specimens of the mammoth *Fasciolaria* (*F. gigantea*), and others of the same family are represented. Large shells of *Busycon perversum*, and fragments of Quahaug valves (*Mercenaria Mortonii* Conrad), are quite abundant. Without a farther enumeration of the species contained in this, the largest of the Way Key mounds, we will hastily glance at others near by. Just

*It is quite common in the Pacific States to hear an insignificant person or place spoken of as a "one-horse fellow," or a "one-horse town," but a "one-cow town" would certainly astonish the most stolid Californian.

north of the above is the second in point of size, but the shell deposit, composed of the same species, is not as thick or deep, while at the north-east is a third mound of exceedingly regular form, also composed of shells; this latter has not been materially defaced, though a house of considerable size has been erected upon its summit. Between the two largest mounds, and connecting them, is a piece of flat or slightly uneven ground, which was used apparently for burial purposes, for here can be obtained human remains undoubtedly aboriginal, and fragments of pottery of large size may be picked up. At other places in the vicinity human bones may be found, but there is no certainty that they are aboriginal. During the war this island was the asylum for deserters and refugees, and the yellow fever and cholera carried off great numbers. They were buried carelessly, and the unmarked graves are scattered over the higher land of the Key.

In examining this part of the island, which is covered with various forms of shrubbery, the visitor frequently stumbles over the hidden resting-place of some poor victim of pestilential disease. A few trees may be seen here and there growing out of the sides or summits of the mounds; the latter are so crossed and defaced by the embankments, ditches and rifle-pits, that it is difficult or impossible to define their original forms and proportions. Before leaving this extensive and interesting cluster of mounds, we ascended to the highest point to obtain a view of the surrounding scenery. Immediately below, and but a few yards from the base of the elevation, a sloping shelly beach runs gradually down beneath the placid waters of the Gulf; the white sail of a boat, hardly moving in the bland and gentle breeze, and the whiter wings of the circling gulls, with islands near and distant, a cloudless sky, and a bright sunshine, combined to form a scene of quiet and dreamy beauty. Not far from the mounds is a mill, where the soft cedar is sawed into blocks of convenient size for the use of the

manufacturers of lead pencils, and in the neighborhood are rude shanties, cabins and houses, that, viewed with the trees and mounds and water, furnish pretty sketches for the drawing-book.

Not many species of shells can be found upon the beach, though much of interest may be dredged in the deeper water of the channel a few hundred yards from the shore. Upon an old wreck, reached at low tide by means of a boat, a species of *Murex* (*M. rufus*) may be collected, and the very common *Littorina* (*L. irrorata*) may be gathered in quantities, sticking to the marsh grass just above the mud.

The steamer from New Orleans that is to carry us farther South having unexpectedly arrived, we were prevented from making an examination of the adjoining islands, or as thorough an investigation of the mounds as their importance demanded. Early in the afternoon we were "all aboard," and soon after the hawsers were cast loose and the steamer was under way; slowly feeling the course through a crooked and insufficient channel an hour passed away before we were in water deep enough to admit of greater speed. The water is so shallow that vessels are compelled to keep a long distance from shore, and the land being flat, but little can be seen from the deck. The mildness of the temperature, the clear sky and smooth sea, made it a delightful trip; and we shall ever remember with pleasure the down voyage from Cedar Keys to Tampa Bay.

THE SAGE BRUSH.

BY W. W. BAILEY.

IN every account of Western travel we meet with this name. It is as common in the vernacular of Nevada and Utah as the word grass is with us, and for the like reason that the plant to which the title is applied is everywhere

present. Readers at the East generally have an entirely incorrect idea of the shrub. If they think of it at all they are misled by its popular name, and consider it synonymous with, or nearly related to the common sage (*Salvia*) of the gardens. The title, however, is not bestowed upon it on account of any actual relationship to that genus of the mint family (*Labiatae*), but merely from its similarity of odor. This is evolved in consequence of any friction, such as results from rubbing the leaves between the hands, or riding among the bushes. Indeed the plant emits its characteristic aroma even when undisturbed, but not in so exaggerated a degree. It is the scent of "wormwood," which is the true English title of the so called wild sage. Its botanical name is *Artemisia*, bestowed in honor of Artemis or Diana. There are many species found upon the Great Plains and in the Interior Basin (*filifolia*, *cana*, *tridentata*, etc.). The species *tridentata* is what I purpose to describe. The specific name means simply "three-toothed," and has reference to the dentated apex of the wedge-shaped leaves.

The plant belongs not to the mints, suggestive of cooling beverages and savory sauces, but to the composites, or great order in which we find the dandelion, the asters, and the sunflowers. The inconspicuous blossoms are densely panicle. The leaves are not green, but silvery or ashy in color. They are borne on scraggy stems, rising, generally, from large and wide-spreading roots. These roots are spirally twisted, and unravel, as it were, like the strands of a rope. They are much used for firewood in this barren section, where little other fuel presents itself. They make a warm fire, but burn much too rapidly. As the supply, however, is inexhaustible, this fault is of no great consequence. They are even used at times in mills and smelting works, where it is impossible to obtain wood.

After careful inquiry I am led to the conclusion that no one has ever seen a *young* sage brush. Even the most confident settler becomes involved in his account when persist-

ently questioned, and cannot tell when or where he noticed the phenomenon. All the specimens met with, and their name is legion, look as if they had been produced, not only mature, but aged; as if they were coeval with the mountains and plains upon which they are found. To the deficiency of chlorophyl in the plant is to be attributed its generally wretched appearance, which is increased by the tendency which the brittle twigs evince to break into snags and prickles.

Where the plant grows to a height of from six to ten feet, as it occasionally does, it is indicative of good soil, and generally of water or moisture present at certain seasons. If it is then uprooted, and vegetables planted in its place, they thrive most abundantly. All that is wanting to much of the apparently sterile soil is the necessary rain to refresh it. Perseverence in systematic irrigation has, in some places, recovered the desert and caused it to "blossom like the rose." The artemisia scorns the alkali flats, and in such localities is succeeded by the wretched grease-wood (*Obione canescens*), and various chenopodiums and other salt loving plants. Some of these are most uninviting and indescribable in appearance. To the traveller they are the synonyms of abomination.

The sage brush grows in clumps, usually separated a few feet from each other. Often it surmounts a mound of sand five or six feet in height. These elevations, rising above the general surface of the plain, dot it in every direction, and one may ride among them for days together. It would appear that the plants mark the original level of the plateau, and that the earth around has been eroded where it was not bound by their interlacing roots. Whether the wind or rain, for it does rain here at times, has been the most potential agent in producing this effect, I am not prepared to affirm. In any other country one would unhesitatingly declare in favor of the latter. Here, however, the wind is almost equally powerful in transforming the face of nature.

In early spring many herbs, and even delicate flowers, may be found among the sage brushes. Some of these plants are exceedingly curious in appearance. Among them are numerous species of the difficult genus *Eriogonum*; *Astragalus* and *Dalea* are also frequent, with *Bigelovia*, *Linosyris*, and other species of compositæ. Beneath the artemisia burrow innumerable frisky lizards, chipmunks, and rabbits (*Lepus callotis*). The latter have the uncomplimentary adjective, "jackass" prefixed to their name, which is a pointed reference to the length of their ears. Then there is the cowardly coyoté, always semi-translucent with hunger. Besides these four-footed creatures, the sage hen is frequently seen, one of the dainties of the traveller's table. One never recovers from his surprise that there should be so much life where apparently there is so little to support it. It is said that the animals live upon each other; but there must be unity to start from, and what that unity finds to sustain it is most questionable.

The artemisia covers the greater part of the Interior Basin between the Sierra Nevada and the Rocky Mountains. It is found from Idaho and Montana to the confines of Mexico. It grows, not only upon the plains and lowlands, but upon the mountains to an altitude of seven or eight thousand feet. In travelling one is rarely out of sight of it. Above is the clear sky; below, and on all sides, the omnipresent sage.

The uses of the plant it must be confessed are limited. Its first and most obvious purpose is to serve as a substitute for fuel. The word substitute is used advisedly. It cannot be dignified by the name of fuel, but does very well in the absence of anything better, and is pined for when, as often happens, there is nothing as good. Rough fences are sometimes made of the uprooted shrubs, or miry places in the highway filled up with them and then covered with earth. Stock will feed upon it when nothing else is obtainable, as doubtless will the Indians, who are not at all particular as

to diet. Whatever may be its actual purpose in nature's economy, it has a good effect whether intended or not, viz., to cause an appreciation of the "greenwood tree." After living amidst the sage for a year, an elm or an oak becomes a wonder, the giant Sequoia of California a miracle. Arborescence, which custom has made familiar to us from childhood, becomes suddenly a mystery, and ever afterwards we cherish all trees with especial fondness, and are thankful to the kind fortune which allots us a home with other surroundings than the forlorn artemisia.

THE DRIVERS.

BY DR. G. A. PERKINS.

A VERY few hours' residence in the tropical regions of Africa brings one into a very undesirable familiarity with that extensive tribe of insects, the ants, some species of which are found in all parts of the world, but which are greatly multiplied in the tropical regions of the globe. Africa, it is believed, can boast of a greater variety than any other land. Their name here is legion. They are everywhere; out of doors and in doors; in your food and in your bed, determined to share both. They are of all sizes; some so small that they pass easily between the threads of common muslin, and even insinuate themselves into your watch as it hangs in your chamber; others measure nearly an inch in length. The habits and food of the different species differ greatly. Some, as the Termites, called White ants (which however are not true ants, but Neuropterous insects), eat vegetable matter exclusively, destroying our houses, furniture and clothing; others are carnivorous; others feed upon sugar or the sweet juices of plants. Any one of the many species, found in so great abundance,

would furnish sufficient material for months of study for the enthusiastic naturalist.

It is of one species only that I propose to speak, the Drivers (*Anomma arcens* of Westwood? Fig. 60); an insect whose life history is yet very imperfectly known, but of whose habits the dweller in the tropical regions of West Africa cannot long remain ignorant.

The Driver ants vary in size from three-quarters of an inch to one-third of an inch in length, the soldiers being the largest. They are of a glossy jet-black color, with a large head armed with exceedingly sharp, branching forceps, or mandibles, with which they seize and cut up their prey. They do not appear to have any fixed habitations, as do the Termites, but excavate the earth from between the roots of trees, and in the cavity thus formed lay their eggs and rear their young, and from which they issue in incredible numbers (literally millions of millions) to go upon their raids.

The night is chosen for their foraging expeditions. In the midst of social enjoyment the stirring announcement is made, "Here are the drivers!" and, instantly as by an electric shock, all are on the alert to escape a personal attack. Lanterns and bamboo torches are lighted, and a search made about the house to learn the direction taken by the assailants; and if in their usual numbers the house is often left to them entirely for hours. And still more unwelcome at the hour of midnight is the bleating of sheep, and cackling of hens, in the enclosure. "All hands" are awaked from their slumbers, and the whole yard lighted; the animals are released from confinement and left to take care of themselves; the fowls removed to a place of safety, if one is to be found; but if neglected and left without the chance of escape their destruction is sure.

The Drivers are alike the enemy of man and beast, though there are times when their visits are most welcome. On their approach every kind of vermin is seized with con-

Fig. 60.



sternation, and seek safety in flight. Centipedes, Cockroaches, scorpions, etc., etc., leave their hiding-places, and are seen seeking places of greater security, only to fall at last into the clutches of their relentless foe, from whom there is no escape.

An invading army could not exhibit a higher state of discipline than is seen in the movements of these insects. They enter a house usually at one point, where a strong guard is stationed to defend the pass; they then branch off right and left, and again divide, and subdivide, till the whole ground is completely covered; not an inch is left unexplored, and every crack and cranny is entered, giving but little hope of escape to any creature that may be found secreted there. Attacking their prey they plunge their forceps into it, regardless of the size or strength of their antagonist. Nothing will cause them to relax their hold. The animal or insect writhes and twists under the pain, but his case is rendered more hopeless every moment by additions to the number of his assailants; at length, when completely exhausted by struggling, he yields to his fate, and is dispatched at the victors' leisure.

The attack goes on simultaneously, in different parts of the house. Animal substance being almost exclusively the food of the Drivers an immense number of the smaller vermin that infest our dwellings are consumed by them, and some of the larger animals when confined are also destroyed by them. They have been known to attack a human being, when rendered helpless by disease, and cause his death in a few hours. It is interesting to see a band of these midnight marauders returning home from the scene of plunder on the approach of day. Issuing from the same place they entered they are each seen bearing away some trophy with them; a joint of a cockroach's leg, the body of a spider, or the larvæ of some insects, etc., are the various spoils. As the laborers pass on with their loads they are guarded by a large body of soldiers which are stationed along the sides of their

path; or, if they are to pass through a place of uncommon exposure, these soldiers form a covered passage, by standing upon each other's back and hooking their forceps together, through this arch thus formed the laborers pass in safety.

When they leave a house it must be from some signal from the leaders, as some of them are seen running from one to another evidently giving command. The retreat is made in good order; not one individual is ever left behind. They often bridge narrow streams of water when these come across their path, by going in large numbers upon a flexible plant on one side of a stream, until their weight causes it to bend to the other side. For courage and activity the soldiers have no equal; they know no fear, and when on duty they stand with their shiny black heads erect and forceps open, ready to seize on any passing animal. No horse, donkey, or dog, can be induced to cross their path, seeming to have an instinctive dread of them; and woe be to the individual, man or beast, who gets among them at night. If a twig is drawn through their ranks they instantly close their forceps upon it; and others in turn close upon their bodies and legs, till a mass of them is seen at the end of the stick looking like a bunch of curled hair.

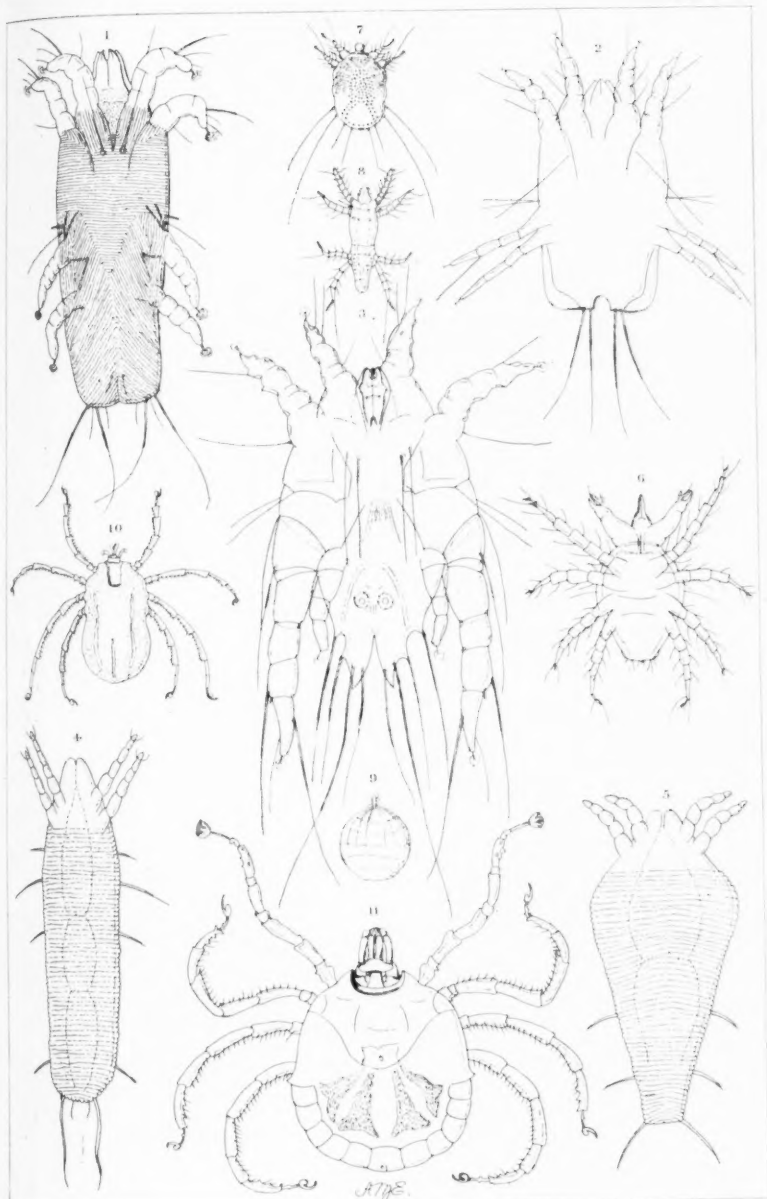
These insects have no eyes, but their sense of smell is very acute, for if the breath be blown on them from the distance of some feet, they are instantly in motion, running to and fro with the greatest speed, evidently aware of the approach of some living being. Though at times they are of great service in ridding our houses of cockroaches and other vermin, yet, when their haunt is near, their visits are much too frequent to be tolerated. Various methods are used to get rid of them, though often with but little success. When they are in large numbers in a small space, scalding water is, perhaps, the best method. By throwing straw or other combustible material upon them, and suffering them to overrun it (which they quickly do), they may then be destroyed by applying a match to the mass. Gunpowder,

also, is sometimes used in their holes; hot ashes, spirits of turpentine, and other articles of the same kind, are useful to turn them from their course. When a live coal is dropped in their way they immediately attack it, though hundreds may perish in doing so. They are very sensitive to the light of the sun, which is fatal to them. They seldom move during the day, and then only during cloudy days, choosing then the dark woods or thick grass. Their rate of progression is about two yards in a minute, and in their journeys from place to place they go from four to eight abreast. I have seen a stream of Drivers crossing an open path at six o'clock in the morning, and at six at night their number was undiminished. How long they had been passing before I saw them, or how long it continued, I am not able to say. Their path, from constant travel, became quite worn and smooth. The natives are very careful to remove all grass from the vicinity of their houses, as a means of keeping off these pests.

A CHAPTER ON MITES.

BY A. S. PACKARD, JR.

BUT few naturalists have busied themselves with the study of mites. The honored names of Hermann, Von Heyden, Dugés, Dujardin and Pagenstecher, Nicolet, Koch and Robin, lead the small number who have published papers in scientific journals. After these, and except an occasional note by an amateur microscopist who occasionally—not to speak too irreverently—pauses from his “diatomaniacal” studies, and looks upon a mite simply as a “microscopic object,” to be classed in his micrographic *Vade Mecum* with mounted specimens of sheep’s wool, and the hairs of other quadrupeds, a distorted proboscis of a fly, and podura scales, we read but little of mites and their habits. But few



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readers of our natural history text-books learn from their pages any definite facts regarding the affinities of these humble creatures, their organization, and the singular metamorphosis a few have been known to pass through. We shall only attempt in the present article to indicate a few of the typical forms of mites, and sketch, with too slight a knowledge to speak with much authority, an imperfect picture of their appearance and modes of living.

Mites are lowly organized Arachnids. This order of insects is divided into the Spiders, the Scorpions, the Harvestmen and the Mites (Acarina). They have a rounded oval body, without the usual division between the head-thorax and abdomen, observable in spiders; the head, thorax, and abdomen being merged in a single mass. There are four

pairs of legs, and the mouth-parts consist, as seen in the adjoining figure of a young tick (Fig. 61, young *Ixodes albipictus* Pack.*), of a pair of maxillæ (c), which in the adult, terminates in a two or three-jointed palpus, or feeler; a pair of mandibles (b), often covered with several rows of fine teeth, and ending in three or four larger hooks, and a serrated

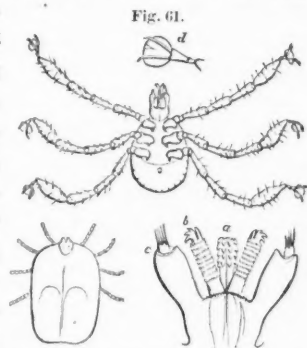


Fig. 61.

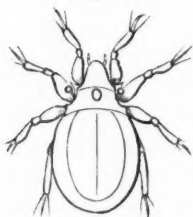
labium (a). These parts form a beak which the mite, or tick, insinuates into the flesh of its host, upon the blood of which it subsists. While many of the mites are parasitic on animals, some are known to devour the eggs of insects and other mites, thrusting their beaks into the egg and sucking the contents. We have seen the mite (*Nothrus*) figured on the following page (Fig. 62) busily engaged in destroying the eggs of the Canker worm, and Dr. Shimer has observed the *Acarus? malus* sucking the eggs of the Chinch bug. While

* The figure at the bottom on the left represents the adult, fully-gorged tick.

a few mites are injurious to man, the larger part are beneficial, being either parasitic and baneful to other noxious animals, or more directly useful as scavengers, removing decaying animal and vegetable substances.

The transformations of the mites are interesting to the philosophic zoölogist, since the young of certain forms are

Fig. 62.



remarkably different from the adults, and in reaching the perfect state the mite passes through a metamorphosis more striking than that of many insects. The young on leaving the egg are usually hexapodous, *i. e.*, have six legs, as we have seen in the case of the *Ixodes albipictus* previously noticed in the NATURALIST (Vol. ii, p. 559). Sometimes, however, as in the case of the larva, as we may call it, of a European species, *Typhlodromus pyri* (Pl. 6, fig. 4), the adult of which, according to A. Scheuten, is allied to *Acarus*, and lives under the epidermis of the leaves of the pear, there are but two pairs of legs present, and the body is long, cylindrical and worm-like. Plate 6, fig. 5 represents the four-legged larva of another species of *Typhlodromus*.

We have had the good fortune to observe the different stages of a bird mite, intermediate in its form between the *Acari* and *Sarcoptes*, or Itch-mite. On March 6th, Mr. C. Cooke called my attention to certain little mites (Pl. 6, fig. 1) which were situated on the narrow groove between the main stem of the barb and the outer edge of the barbs of the feathers of the Downy Woodpecker, and subsequently we found the other forms indicated in Plate 6, figs. 2 and 3, in the down under the feathers. These long worm-like mites were evidently the young of the singular *Sarcoptes*-like mite, represented by figs. 2 and 3 of the plate, as they were found on the same specimen of Woodpecker at about the same date, and it is known that the growth of mites is rapid, the metamorphoses occupying but a few days.

The larva (though there is, probably, a still earlier hexapodous stage) of this Sarcoptid has an elongated, oblong, flattened body, with four short legs, provided with a few bristle-like hairs, and ending in a stalked sucker, by aid of which the mite is enabled to walk over smooth, hard surfaces. The body is square at the end, with a slight median indentation, and four long bristles of equal length. They remained motionless in the groove on the barb of the feather, and when removed seemed very inert and sluggish. A succeeding stage of this mite, which may be called the pupal, is represented on Plate 6, fig. 2. It is considerably smaller than the larva (all the figures of this sarcoptid being drawn to one scale by Prof. A. M. Edwards, and magnified 115 diameters), and looks somewhat like the adult, the body having become shorter and broader. It is perhaps the pupa, or nymph. The adult (Pl. 6, fig. 3) is a most singular form, its body being rudely ovate, with the head sunken between the fore legs, which are considerably smaller than the second pair, while the third pair are twice as large as the second pair, and directed backwards, and the fourth pair are very small, not reaching the extremity of the body, which is deeply cleft, and supports four long bristles on each side of the cleft, while other bristles are attached to the legs and body, giving the creature, originally ill-shapen, a haggard, unkempt appearance. The two stigmata, or breathing pores, open near the cleft in the end of the body, and the external opening of the oviduct is situated between the largest or third pair of legs. No males were observed. In a species of *Acarus* (*Tyroglyphus*), somewhat like the Cheese-mite, which we have alive at the time of writing, in a box containing the remains of a *Lucanus* larva, which they seem to have consumed, as both young and old are swarming there by myriads, the young are oval and like the adults, except that they are six-legged, the fourth pair growing out after a succeeding moult.

Such is a brief summary of what has been generally

known regarding the metamorphoses of a few species of mites. But a French naturalist, C. Robin, has recently observed in certain bird sarcoptids, to which the parasite of the Downy Woodpecker noticed above is allied, a still "more complicated series of phenomena; in these the males pass through four, and the females through five stages, indicated as follows: (1) the *egg*, on issuing from which the animal has the form of (2) a *hexapod larva*, followed by the stage of (3) *octopod nymphæ* [four-footed pupæ], without sexual organs. (4) From some of these nymphæ issue: *a*, *sexual males*, after a moult which is final for them; *b*, from others issue *females without external sexual organs*, resembling the nymphæ, but larger, and in some species furnished with special copulatory organs. Finally, after a last moult following copulation, these females produce (5) the *sexual and fecundated females*, which do not copulate, and in the ovary of which eggs are to be seen. No moult follows that which produces males or females furnished with sexual organs; but previously to this the moults are more numerous than the changes of condition." "The larvæ undergo from two to three moults before passing to the state of nymphæ." These latter also undergo two or three moults. (*Annals and Magazine of Natural History*, 1868, p. 78.)

In some other species of mites no males have been found, and the females have been isolated after being hatched, and yet have been known to lay eggs, which produced young without the interposition of the males. This parthenogenesis has been noticed in several species.

With their rapid increase in numbers these insects often suddenly appear in vast numbers on various articles of food, and about houses, so as to be very annoying. Mr. J. H. Gregory, of Marblehead, Mass., has found the mite figured on plate 6, fig. 6 (magnified 60 diameters), very injurious to the seeds of the cabbage, which it sucked dry. This is an interesting form and appears to belong to the genus *Cheyltus*. It is of medium size, and especially noticeable from

the tripartite palpi, which are divided into an outer, long, curved, clawlike lobe, with two rounded teeth at the base, and two inner, slender lobes pectinated on the inner side, the third innermost lobe being minute. The beak terminates in a sharp blade-like point.

We will now give a hasty glance at the different groups of mites, pausing to note those most interesting from their habits or relation to man.

The most highly organized mite (and by its structure most closely allied to the spider) is the little red garden mite, belonging to the genus *Trombidium*, to which the genus *Tetranychus* is also nearly related. Our own species of the former genus have not been "worked up," or in other words identified and described, so that whether the European *T. holosericeum* Linn. is our species or not, we cannot tell. The larvæ of this and similar species are known in Europe to live parasitically upon Harvest-men (*Phalangium*), often called Daddy-long-legs; and upon Aphides and other insects. The European *Tetranychus telarius* Linn., or web-making mite, spins large webs on the leaves of the linden tree. Then succeed in the natural order the water mites, *Hydrachna*, which may be seen running over submerged sticks and on plants, mostly in fresh water, and rarely on the borders of the sea. The young, after leaving the eggs, differ remarkably from the adults, so as to have been referred to a distinct genus (*Achlysia*) by the great French naturalist, Audouin. They live as parasites on various water insects, such as *Dytiscus*, *Nepa* and *Hydrometra*, and when mature live free in the water, though Von Baer observed an adult *Hydrachna concharum* living parasitically on the gills of the fresh-water mussel, *Anodon*. The species are of minute size.

Collectors of beetles often meet with a species of *Uropoda* attached firmly to their specimens of dung-inhabiting or carrion beetles. It is a smoothly polished, round, flattened mite, with short, thick legs, scarcely reaching beyond

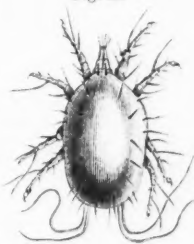
the body. We now come to the Ticks, which comprise the largest mites. The genus *Argas* closely resembles *Ixodes*. Gerstaecker states that the *Argas Persicus* is very annoying to travellers in Persia. The habits of the wood ticks, *Ixodes*, have been already referred to in the NATURALIST (Vols. ii, p. 559; iii, p. 51). Travellers in the tropics speak of the intolerable torment occasioned by these pests, which, occurring ordinarily on shrubs and trees, attach themselves to all sorts of reptiles, beasts and cattle, and even man himself as he passes by within their reach. Sometimes cases fall within the practice of the physician, who is called to remove the tick which is found sometimes literally buried under the skin. Mr. J. Stauffer writes me, that "on June 23d the daughter of Abraham Jackson (colored), playing among the leaves in a wood, near Springville, Lancaster County, Penn., on her return home complained of pain in the arm. No attention was paid to it till the next day, when a raised tumor was noticed, a small portion protruding through the skin, apparently like a splinter of wood. The child was taken to Dr. Morency, who applied the forceps, and after considerable pain to the child, and labor to himself, extracted a species of *Ixodes*, nearly one-quarter of an inch long, and of an oval form and brown mahogany color, with a metallic spot, like silver bronze, centrally on the dorsal region." This tick proved, from Mr. Stauffer's figures, to be, without doubt, *Ixodes unipunctata* Pack. (Pl. 6, fig. 11, enlarged). It has also been found in Massachusetts by Mr. F. G. Sanborn.

Another species is the *Ixodes bovis* Riley (Pl. 6, fig. 10), the common cattle tick of the Western States and Central America. It is very annoying to horned cattle, gorging itself with their blood, but is by no means confined to them alone, as it lives indifferently upon the rattlesnake, the iguana, small mammals, and undoubtedly any other animal that brushes by its lurking-place in the forest. It is a reddish, coriaceous, flattened, seed-like creature, with the body

oblong oval, and contracted just behind the middle. When fully grown it measures from a quarter to half an inch in length. We have received it from Missouri, at the hands of Mr. Riley, and Mr. J. A. McNiell has found it very abundantly on horned cattle on the western coast of Nicaragua. We now come to the genus *Acarus* (*Tyroglyphus*), of which the cheese and sugar mites are examples. These, and their allied forms, are among the most lowly organized of the Arachnids, and seem to connect the spiders with the Crustacea, the sea-spiders (*Pycnogonids*) bearing a remarkable resemblance to certain mites. Some species of Acarian mites have been found in the lungs and blood-vessels, and even the intestinal canal of certain vertebrates, while the too familiar itch insect lurks under the skin of the hand and other parts of the body of uncleanly human bipeds.

Many people have been startled by statements in newspapers and more authoritative sources, as to the immense numbers of mites (*Acarus sacchari*, fig. 63) found in unrefined or raw sugar. According to Prof. Cameron, of Dublin, as quoted in the "Journal of the Franklin Institute," for November, 1868, "Dr. Hassel (who was the first to notice their general occurrence in the raw sugar sold in London) found them in a living state in no fewer than sixty-nine out of seventy-two samples. He did not detect them in a single specimen of refined sugar. In an inferior sample of raw sugar, examined in Dublin by Mr. Cameron, he reports finding five hundred mites in ten grains of sugar, so that in a pound's weight occurred one hundred thousand of these little creatures, which seem to have devoted themselves with a martyr-like zeal to the adulteration of sugar. They appear as white specks in the sugar. The disease known as grocer's itch is, undoubtedly, due to the presence of this mite, which, like its ally the *Sarcoptes*, works its way under the

Fig. 63.



skin of the hand, in this case, however, of cleanly persons. Mr. Cameron states that "the kind of sugar which is both healthful and economical, is the dry, large-grained, and light-colored variety."

Closely allied to the preceding, is the Cheese-mite (*Acarus siro* Linn.), which often abounds in newly made cheese. Lyonet states that during summer this mite is viviparous. *Acarus farinæ* DeGeer, as its name indicates, is found in flour. Other species have been known to occur in ulcers.

The itch insect (*Sarcoptes scabiei* DeGeer, Pl. 6, fig. 7) was first recognized by an Arabian author of the twelfth century, as the cause of the disease which results from its attacks. The body of the insect is rounded, with the two hind pair of feet rudimentary and bearing long hairs. It buries itself in the skin on the more protected parts of the body, and by its punctures maintains a constant irritation.

Fig. 64. Other species are known to infest the sheep and dog.



Another singular mite is the *Demodex folliculorum* (Fig. 64), which was discovered by Dr. Simon, of Berlin, buried in the diseased follicles of the wings of the nose in man. It is a long slender worm-like form, with eight short legs, and in the larva state has six legs. This singular form is the lowest and most degraded of the order of Arachnids. We figure on plate 6, figs. 8 and 9, greatly enlarged, a most singular mite, discovered by Newport on the body of a larva of a wild bee, and described by him under the name of *Heleuropus ventricosus*. Fig. 8, in the plate, represents the body of the fully formed female. After attaining this form, its small abdomen begins to enlarge until it assumes a globular form (Fig. 9), and the mass of mites look like little beads. Mr. Newport was unable to discover the male, and thought that this mite was parthenogenous. It will be seen that the adult *Demodex* retains the elongated, worm-like appearance of the larva of the higher mites, such as *Typhlodromus*. This is an indication of its low rank, and hints of a relation-

ship to the Tardigrades and the Pentastoma, the latter being a degraded worm, living parasitically within the bodies of other animals.

EXPLANATION OF PLATE VI.

- Fig. 1. Larva of a bird mite, *Dermaleichus*.
 Fig. 2. Pupa (?) of the same.
 Fig. 3. Adult female of the same.
 Fig. 4. Larva of *Typhlodromus pyri* Scheuten. (From Scheuten.)
 Fig. 5. Larva of another species of *Typhlodromus*. " "
 Fig. 6. *Chelytus* (probably undescribed).
 Fig. 7. *Sarcoptes scabiei* DeGeer. (From Gervais.)
 Fig. 8. *Heteropus ventricosus* Newport, fully-formed female. (From Newport.)
 Fig. 9. *Heteropus ventricosus* Newport, gravid female. (From Newport.)
 Fig. 10. *Ixodes bovis* Riley.
 Fig. 11. *Ixodes unipunctata* Packard.

THE FRESH-WATER AQUARIUM.

BY C. B. BRIGHAM.

(Continued from page 212.)

THE question is often asked what kinds of plants are the best for the aquarium, and where are they found? Most writers on this subject give long lists of plants, which are useless to those who are unacquainted with the botanical names. To the majority of people not even the common names of most water plants are known, and to such it becomes very perplexing to make a selection from a list bare of any description. Although it is insisted by some that the tank should not be filled with every kind of plant that the collector can obtain, yet it seems as if there was no sound reason why all the plants that flourish in the aquarium should not be placed therein. In a properly managed aquarium there are very few water plants which will not do well; the few exceptions being found in the lilies, which require a

deeper soil than is convenient in the tank, and in those plants accustomed to a lower temperature of the water than is easy to maintain. Apart from these take any of the green plants found in ponds, and placing them in the tank, watch their growth, and a few weeks' trial will determine their value whether they are of use or for ornament. It is hardly practicable to arrange the plants in the tank in botanical order, the room is so limited. A better way, if we wish such an arrangement, would be to devote a separate tank to each variety. This could easily be done in what is called the cabinet aquarium, which will be noticed hereafter. An affair of this sort enables one to have a large collection of plants, changing the light or temperature as the case requires.

Before giving the names of a few of our native plants which are favorites in the aquarium, it may be well to say a few words as to the locality in which most are found, for to one who takes a real interest in the aquarium, it will not suffice to pick out a few plants here and there from the collections of dealers in specimens, which by the way are not numerous. Half of the pleasure, to say nothing of the profit in having an aquarium, is in hunting for one's own specimens, and in realizing that there is much more life in the waters of a pond than we before imagined. To those who pass some time during the year in the country, there will be ample means for collecting specimens in the ponds near by; but to residents of cities the task will not be so easy, although it will depend a good deal upon the facilities for getting into the country. Take for example the two cities of Boston and Worcester. A ride of fifteen minutes in the steam cars will take one from the former place to Fresh Pond, in Cambridge, which is rich in aquarial specimens. The brooks in the marshes, near what is called the "Glacialis," abound in larvæ, fresh-water snails, and the smaller specimens, while Fresh Pond itself contains nearly all our common water plants. Tritons, or fresh-water newts, are

not to be found there, but not so with small turtles, which at certain seasons of the year, especially in the fall, are quite common. There is, I believe, no place equally near Boston, which has so complete a collection of aquarial specimens as Fresh Pond. Worcester offers great advantages to the collector in its beautiful Long Pond, or, as it is recently called, Lake Quinsigamond. The pond itself has few plants on account of its depth, but if we follow it up to the river which helps to form it, and then to the other pond above, near the place where a few years ago the old mill house stood, we shall find all the specimens we could wish for. In this upper pond the plants, instead of growing with the various kinds, mingling recklessly together as usual, are found in a general way, with each kind in a large patch by itself as if some one had planted them so, making as it were an aquatic-botanical garden. We may go in the opposite direction down the pond, a few miles below the bridge which crosses it, until we come to the dam which separates Long from what is called Half-moon Pond. If it is midsummer, and early in the morning, we shall find ourselves surrounded by acres of water-lilies, beneath which are the desired specimens. All along from this dam, towards Grafton, a chain of shallow ponds connected by rivers invites our attention, and the scenery alone would be a sufficient inducement to bring the naturalist to the spot. The three kinds of plants which are the best suited for the aquarium, of all our natives, are *Ceratophyllum demersum*; *Utricularia vulgaris*, *inflata*, and *minor*; *Potamogeton natans*, *Claytonii*, and others.*

*They are thus described by Dr. Gray. (Manual of Botany of the Northern States. By Asa Gray. 1867.)

"*Ceratophyllum*: Hornwort. Sterile flowers of 12-24 stamens, with large sessile anthers. Fruit an achemium, beaked with the slender persistent style. Herbs growing under water in ponds or slow flowing streams. The sessile leaves cut into thrice-forked thread-like rigid divisions (whence the name from *κέρας*, a horn, and *φύλλον*, a leaf)."

"*Utricularia*: Bladderwort. Lips of the 2-parted calyx entire or nearly so. Corolla personate, the palate on the lower lip projecting, often closing the throat. Anthers convergent, aquatic and immersed, with capillary dissected leaves bearing little blad-

Besides these plants the floating Duckweed (*Lemna trisulca*) is a very valuable addition to the collection. Water-lily plants are not only difficult to make grow, but their leaves are apt to be ill-proportioned to the size of the tank. In duckweed both these troubles are done away with, for we have a plant which is easily grown, and one which gives to the aquarium the appearance of a miniature pond. It is found in brooks at the roadside and in shallow ponds, especially in the autumn season. The *Limnocharis Humboldtii*, a lily sometimes grown in tanks in greenhouses, is also a good plant for the aquarium, where, if care be taken, it will blossom freely. There is a moss-like plant of bluish green color, found growing on stones in brooks, and under bridges in shady places in the water. It is called *Fontinalis antipyretica*, and it is one of the few brook plants that will do well in the aquarium. The water buttercup, *Ranunculus aquatilis*, has only its beauty to recommend it, for it hardly survives the winter in the tank. A plant of the Frog's-bit family, *Anacharis Canadensis*, is another excellent one for the aquarium. It gives to the fresh-water aquarium an appearance similar to that which the *Ulva latissima* gives to the marine tank.

Having made a collection of plants, and thoroughly washed them, the next thing is to arrange them in the tank. This arrangement must be according to the taste of the collector. One way, perhaps as good as any, is to make four bunches of plants of suitable size, and place one in each corner of the tank if it is rectangular; they do not then ob-

ders, which are filled with air and float the plant at the time of flowering; or rooting in the mud, sometimes with few or no leaves or bladders (name from *Utriculus*, a little bladder)."

"*Potamogeton*: Pond-weed. Flowers perfect. Sepals 4, rounded, valvate in the bud. Stamens 4, opposite the sepals; anthers nearly sessile, 2-celled. Ovaries 4 (rarely only one), with an ascending campylotropous ovule. Stigma sessile, or on a short style. Fruit drupe-like when fresh, more or less compressed; endocarp (nutlet) crustaceous. Herbs of fresh or one in brackish ponds and streams, with jointed, mostly rooting stems, and 2-ranked leaves, which are usually alternate or imperfectly opposite. The submersed ones pellucid, the floating ones often dilated and of a firmer texture (an ancient name composed of ποταμός, a river, and γειτων, a neighbor, from their place of growth)."

struct the view of the tank; they take up the room which is the least valuable of any, and yet can be seen to great advantage. As the plants grow the tops of the branches meet and form an arch of green on all sides of the rockwork in the centre. They may be held in position, as was suggested by a friend, by fastening to them, by a thread or fine piece of string, a small stone of sufficient weight to anchor the plants and keep them in place. If this is not done, and the plants left to themselves or with the ends of their stems simply held down by a stone placed over them, we shall find them continually being turned upside-down by the mussels, turtles, or other live stock of the aquarium.—*To be continued.*

REVIEWS.

THE INJURY DONE TO FORESTS BY INSECTS.*—Before giving our readers an idea of the contents of these volumes, we must first express the delight and wonder we have felt at the industry and skill exhibited in this magnificent work. It is a thorough monograph of the natural history of the forest insects, and the injury done by them to forest trees in Germany, by one of the best of living naturalists, who, by his previous works on Forest Insects (*Die Forstinsekten*, 1839-44), has, more than any other writer perhaps in Europe, built up the science of economical entomology. It is of the class of works to which Audouin's superb, and now very rare, volume on the insects of the Vine, Curtis' *Farm Insects*, Boisdual's recent work on horticultural entomology, and Harris' *Insects of Massachusetts* injurious to vegetation, are examples. Such works as these are an honor to any state or country, and do more to bring abstract scientific studies into favor with the masses, demonstrating the direct money value of the labors of the naturalist, than any other class of books. In the elaborate and beautifully executed plates that enrich the two volumes before us is reproduced the tree as it stands in the forest, gnarled and distorted by one set of insects, its leaves curled and turned yellow, or red, by the attacks of others, with certain branches stripped by still others; and not only are certain trees and shrubs thus represented in colors, but some of the plates represent parts of a forest, showing the

*Die Waldverderbniss oder dauernder Schade, welcher durch Insektenfrass, Schalen Schlägen und Verblissen an lebenden Waldbaumen entsteht. Von Dr. J. T. C. Ratzburg. 2 vols., 4to. Berlin, 1866-'68. With fifty-seven plates and numerous wood-cuts. \$20.00 in gold.

injury done in the mass by one or two insects. To give one example in illustration, from among the fifty-seven plates contained in the two volumes, plates five and six contain twenty-one figures, showing the injury done by the *Bombyx pini* and *B. monacha* to the pine, and the changes in the form of the branches and leaves for several years succeeding the defoliation, and the after growth of different branches depending on the different degrees of injury, with transverse sections of the twigs, and microscopic sections illustrating the pathological anatomy of the tree; all the points being illustrated in the figures and discussed in the text with a minuteness and care that are almost incredible for one man to have accomplished.

We would speak most enthusiastically of the work, because we have not often been so impressed by the labors of a single man, who has already published so much. It will give a new impetus to economical entomology, and we hope the work will meet with a wide circulation in this country, where the same injuries are produced by analogous insects, and perhaps greater losses are sustained from the attacks of insects than even in Europe. Such a work on fruit trees, field and garden vegetables, is now demanded, before the whole subject of economical entomology will have been thoroughly discussed.

HAND-BOOK OF ECONOMIC ZOÖLOGY FOR AGRICULTURISTS.*—Another book, by the same author, for still more general circulation, is, as its title runs, "the forest-destroyers and their enemies, or a description and illustration of injurious forest insects and animals generally destructive to forests, with advice as to the means of their extermination, and for the protection of their enemies. A hand-book for foresters, gardeners, etc." It is perhaps the most comprehensive work on economic zoölogy yet published, and a perfect treasury of information regarding all the varied relations of animals (especially insects) destructive to forests.

RECORD OF AMERICAN ENTOMOLOGY FOR 1868.†—After unforeseen delays this long promised year-book has appeared, and we trust that entomologists will feel inclined to purchase a copy, if for no other reason than to aid in the establishment of a yearly record of their labors, which cannot fail to develop new students of entomology, and stimulate those already at work. The Editor has been assisted by Mr. S. H. Scudder, Baron Osten Sacken, Dr. J. L. Leconte, Mr. P. R. Uhler and Dr. H. Hagen. The present "Record" contains, with two exceptions, no references to papers published in European Scientific journals, as copies were not obtained in time to be noticed. It is therefore in this respect imperfect, but such papers will be noticed in the "Record" for the succeeding year. The Editor, therefore, in his preface requests European entomologists to send, promptly, separately printed copies of such papers as relate to American insects, to the Editor, Dr. A. S. Packard, Salem,

* Sixth edition, enlarged and improved. With seven colored and plain copper plates, lithograph plates, wood cuts, and insect calendars, etc., etc. 8vo, Berlin, 1869. \$4.00 gold.

† Salem, Naturalist's Book Agency. 8vo, pp. 60. Price \$1.00.

Mass., that their labors may be recorded, and the "Record" be made more complete. Four hundred and two new species are described from North (including Central) America, and Dr. Hagen briefly describes four new false scorpions. The "Record" refers to notices and articles by forty-five different writers.

A LEPIDOPTERIST'S GUIDE.*—This is a very comprehensive and compact guide for the study of butterflies and moths, and with but few changes would answer for the use of collectors in this country. We advise every lepidopterist to provide himself with a copy.

GUIDE TO THE STUDY OF INSECTS.†—The eighth part of the "Guide" has appeared; two more parts will finish the work, and the ninth part will appear in August. The tenth part (completing the work) will contain a glossary, a calendar of the appearances of insects, and a full index. The present part nearly completes the chapter on Coleoptera, and is illustrated by 114 wood cuts, about half of which represent the early stages of beetles, some of which have not before been published.

THE PEABODY MUSEUM OF AMERICAN ARCHEOLOGY AND ETHNOLOGY.‡—Prof. Wyman, the curator, reports that the collections have been increased by the addition of from four to five thousand specimens. It is a matter of congratulation that two very valuable collections of European antiquities have been bought and are now in the possession of this museum. The first is that of Gabriel de Mortillet, made in France, and that of Wilmot J. Rose, made in Denmark. The first illustrates the early condition of the human race in France, with objects belonging to some of the analogous periods from other countries, especially Switzerland and Italy, and comprises about 3000 specimens, mostly representing the Age of Stone, and the Age of Metals. The Rose collection "comprises 1559 specimens, of which about fifty are of bronze or iron, a few of bone, and the rest of stone, mostly flint." The Curator remarks, "with the acquisition of the collection just referred to, from Denmark, the Mortillet collection from France, and the Clement collection from Switzerland, the Peabody Museum has accomplished one of its more important objects, viz., the gathering of the means for making direct comparison between the implements of the Stone Age of the old world and the new."

THE PEABODY ACADEMY OF SCIENCE.§—This report contains the history of the organization of the Academy, and of the preliminary arrangement of the Museum, formed by the union of the collections of the Essex

*The Lepidopterist's Guide, intended for the use of the young collector, containing full instructions for the Collecting, Management, Observation and Preservation of Lepidoptera in all their stages. By H. Guard Knaggs, M. D. London: Van Voorst, 1869. 12mo, pp. 122. 50 cents, gold.

†A Guide to the Study of Insects, etc. By A. S. Packard, Jr., M. D. Salem: Naturalist's Book Agency, London: Trubner & Co. Part viii, pp. 64. June, 1868. Price 50 cents a part. To be published in ten parts.

‡Second Annual Report of the Trustees. Boston, 1869. 8vo, pp. 23.

§First Annual Report of the Trustees, etc. Salem, 1869. 8vo, pp. 103.

Institute and the East India Marine Society, and the Director of the Museum (F. W. Putnam) gives a description and plans of the arrangement of the Hall and cases, and of the arrangement of the different classes of specimens both on the floor and in the galleries. The report of the proceedings of the trustees is followed by a report of the Council, containing reports of the Director and Curators, with an appendix, entitled "List of Hymenopterous and Lepidopterous Insects collected by the Smithsonian Expedition to South America, under Prof. James Orton, by A. S. Packard, jr." The Formicidæ enumerated are named by Mr. Edward Norton. Mr. E. S. Morse, in the appendix to his report on the condition of the Mollusca, describes *Actinobolus* (Cyclocardia) *Novanglia* as an Essex county shell, which he separates from *Cardita borealis*, and illustrates the difference by wood cuts. There is also appended a report by Mr. J. A. McNeil on his expedition to Central America, and the Director and Curators report a proposed plan of operations for the Academy, (prepared by Mr. A. Hyatt), in which is suggested a Survey of the Physical and Natural History of Essex County. The following votes by the Council are recorded:

Voted, "That in labelling the collections all nouns used as specific names, and specific names when derived from proper names shall be written with capital initial letters, and also, that the same rule shall obtain in the official publications of the Academy." It was also further voted, "that in labelling the collections, the name of the person who first united the generic and specific appellations shall be given as the authority for the name, and that when the name of the original describer of the species is given, it shall be in parenthesis."

NATURAL HISTORY MISCELLANY.

BOTANY.

FLOWERING OF POSOQUERIA.—In the October number of the *NATURALIST* (1868), was given on page 437, and following, an account of the phenomena displayed in flowering by a species of *Posoqueria* in the Botanic Garden here; and a comparison of them with similar ones exhibited by a species of the same genus as witnessed and described by Mr. Fritz Müller, in the island of Santa Catarina on the Coast of Brazil. I felt convinced then, and am so still, that we had the same plant in view. Not the slightest essential difference can be discovered between our plant and the figures of his. I stated—doubtfully, it is true, because my experiments had not been so numerous as his, and because I had made a slight omission of one particular as conducted by him—that I thought he was mistaken in his view of the mechanism of the phenomenon. The plant is now in flower, and has given me the opportunity to test the irritability, if such there be, at the point indicated by him. I faithfully tickled the upper filaments at the curvature without the least effect, except in one instance, when the anther mass burst asunder during the experiment. But it might have been near the time when they explode in

the progress of the flower from expansion towards decay, as they always do sooner or later, whether through the aid of an insect or not. I feel perfectly convinced that the titillation, by the legs of small or even large insects, of the filaments is not *the* mode of effecting the explosion of the anther mass. On the other hand *abundant* experiments have shown that a slight pressure upon this mass *is* effectual, and uniformly so to the diffusion of the pollen.

In a short time we shall have more flowers, and we would be pleased to show it to any who take an interest in such phenomena; and we will be more than pleased if any one skilful in such matters will make a thorough anatomical examination of the mechanism by which it is effected.
—CHARLES WRIGHT.

A WHITE ARETHUSA.—June 6th, '69, a friend sent me from Plymouth, Mass., hundreds of the *Arethusa bulbosa* in blossom; among them was a pure *white* one. The specimen, which was an unusually fine one, was found growing in the open sunshine in a swamp covered for an acre in extent with the usual high-colored ones. I myself found the same freak of nature at Lexington last year, and carried the plant to Dr. Gray, who told me it was the first *white Arethusa* he had ever seen, though he often met albinos of other families of plants on his botanical rambles.—C. A. B., Cambridge, Mass.

ABNORMAL FORMS OF PLANTS.—As much enquiry has of late been directed to variation in plants, particularly in those growing in a wild state, removed from any influence of cultivation, I would contribute from my own observations the following facts on the subject:

A remarkable form of *Fragaria Virginiana* var. *Illinoensis* Gray, was found by me last summer, in abundance, in two localities on Lake Superior, remote from culture. The petals had changed, or were partially altered to stamens, in most instances the transformation being complete. The singularity of the plant was apparent at a glance. This is an interesting case for a Darwinian, as it would appear that this plant, not satisfied with the variation it had previously accomplished, was still demonstrating its inclination to progress! I inclose a specimen. A strange form of *Viola blanda* Willd., which I found growing on wooded mountain slopes, was of unusually large size, the great reniform leaves were matted with dense hair, which also clothed the petioles, peduncles, etc. A variety of *V. Selkirkii* (Pursh) Goldie, having the leaves less hairy, and with a pale grayish blue corolla, unmarked with purple streaks and with more white than usual, grew not unfrequently with the ordinary form in open woods. *Trifolium repens* Linn., flourished in open patches on mountain slopes, having its leaves often from four to six-foliolate. This was casting the four-leaved shamrock into the shade. Deep in the forest I encountered *Mitchella repens* Linn., with, in many cases, its corolla six to seven-lobed. I also discovered a single instance of *Botrychium Virginicum* Swartz., with a second perfect though smaller fertile frond rising on an independent stalk from the centre of the largest primary division of

its sterile frond. The smallest divisions of the sterile frond were, a few of them, changed to fertile clusters. In this connection I would state that a smaller, delicate form of *B. lanceolatum* Angström, having the sterile segment less dissected, appears to me a decided variety. I have collected both forms on Lake Superior.

The remarks in the February number on *Onoclea sensibilis* var. *obtusilobata* Torr., lead me to say that this variety was found by me some seasons ago on the banks of the Bloody Run, Detroit. To my observation it is quite rare. Mr. Crittenden's plant does not seem to me to differ essentially from mine, in which some of the segments of the pinnae are much contracted and revolute, though most of them preserve the foliaceous character, particularly at and towards the summit of the frond. Intermediate states and partially developed forms would naturally be expected.

To the white varieties, or albinos, which I have already noticed, I would add the following, since contributed to my list: *Cirsium muticum* Michx., abundant in 1868, and the rare *Arethusa bulbosa* Linn., and *Calypogon pulchellus* R. Brown, in former years.—HENRY GILLMAN, Detroit.

DOUBLE THALICTRUM ANEMONOIDES.—Enclosed is the photograph of a double flower of the *Thalictrum anemonoides* Michx. I found it in the woods at "Cedar Ridge," a locality known to all readers of the NATURALIST who have been in Poughkeepsie. It was growing in the midst of other plants of the usual form of *T. anemonoides*. Every stamen and pistil was transformed, so that the flower was completely double; and both for its exceeding and exquisite beauty, and the rarity of a double natural flower, I had its picture taken.—M. M. SHATTUCK, Poughkeepsie.

BOTANICAL NOTES.—The mention of certain species in your botanical notes has reminded me of an individual of *Trillium erythrocarpum* gathered here, having the parts in fours, viz.: four leaves, four sepals, four petals, and eight stamens. I have never met with another, and do not know whether such variation is common or not. Also of the occurrence of *Saxifraga aizoon* and several other northern species on Kennebeckasis Bay. Altogether, we know of the occurrence in this Province and in Eastern and Northern Maine, of twelve arctic and subarctic species, sixty boreal or high northern (ranging by Lake Superior to the Arctic Circle) and sixteen western or continental species, rare or wanting in the United States, east of New York.—G. F. MATTHEWS, St. John, N. B.

IS THE ELDER A NATIVE PLANT?—Looking over the NATURALIST for March, 1868, I find that an enquiry has been made whether *Sambucus Canadensis* is a native plant. If the question is not already settled it may not be useless to state, even at this day, that both that and *S. pubens*, or their Western representatives, are common in Washington Territory and Oregon, and that one of them, if not both, extend as far South at least as Humboldt Bay, California, where I have seen a tree as large round as a man's thigh.—GEORGE GIBBS, New York.

ZOOLOGY.

NORTH ATLANTIC DREDGING EXPEDITION.—On page 278 (paragraph next to last) of the July number of the *NATURALIST*, reference is made to deep sea-dredging by Dr. Carpenter and Wyville Thompson, of England, a government steamer having been placed at their disposal for the purpose. Upon the back of a letter recently received from my friend Dr. P. P. Carpenter, of Montreal, he writes that "*Buccinum undatum* was found living at a depth of 1300 fathoms!! by my nephew and J. G. Jeffreys, on H. M. ship Porcupine." The donkey-engine was used to hoist the dredge.

The deep-sea dredging operations of the late Prof. Edward Forbes, of Sars, and MacAndrew, disclosed facts entirely inconsistent with the theory that prevailed previous to their investigations, in reference to the depth below the surface of the sea at which animal life could exist. With the data already in our possession, it is highly probable that farther investigations will show still more surprising results, and that life will be found to exist at depths greatly exceeding that mentioned by Dr. Carpenter. Humboldt, climbing Chimborazo, found flies buzzing around him at a height of over 18000 feet, and scientific research may yet show life from an equal depth below the sea-level.—R. E. C. STEARNS.

PARASITES OF ASCIDIANS.—In the Ascidians of Northern Europe a great number of parasitic Crustacea, mostly small Entomostracas, have been observed. Some of these are of peculiar interest, but in this country very little attention has been devoted to this subject. In dissecting a specimen of the commonest Ascidian (*Ascidia callosa*) of the coast of Maine recently, I found in the interior an interesting amphipod Crustacean, not yet determined specifically. Its length is about a quarter of an inch. Doubtless many other species of Crustaceans might be found by carefully searching this and other common Ascidians. Dr. Stimpson, in his "Shells of New England," p. 12, observes that in Europe the species of *Crenella* (*Modiolaria*) have the habit of burrowing in the test of Ascidians, while on this coast the same species do not have this habit. We found, however, at Eastport last season, a specimen of *Ascidia callosa*, with a small specimen of *Modiolaria discors* completely embedded in its test.—A. E. VERRILL.

LABRADOR DUCK.—In the August (1868) *NATURALIST*, A. R. Y. mentions that the Pied or Labrador duck, was shot on Long Island last winter. I would be much obliged to A. R. Y. if he would let me know if the specimens shot were full-plumaged males, and who has them? This is a very interesting bird to the naturalist, from the fact of its being so rare, and I had almost begun to think the bird had left us, as I had not heard of a full-plumaged male being taken for ten years. I have been shown two which were taken for the young, but one was a young albino Scoter, and the other I did not know. Not many years ago it was a common bird all along our coast, from Delaware to Labrador; and in the New York market there would at times be dozens of them; and then for a few years not

one. It would be very interesting to know where they have gone. Though so much has been learned of the distribution, summer and winter homes of birds within a few years, their breeding habits, line of travel north and south, and from the numerous collectors who have gone to Labrador, the fur countries and across the continent; yet not one word is said about the Labrador duck, a common bird a few years ago. So good a flyer and diver cannot be extinct like the clumsy *Alca impennis* (Great Auk), and any collector who may take a full-plumaged bird, or knows where they have gone, by letting it be known in the NATURALIST, would interest many of its readers.—GEO. A. BOARDMAN, *Milltown, Me.*

WINTER BIRDS OF NEW YORK.—I send you the following list of birds seen in the vicinity of Utica, N. Y., throughout the winter of 1868-9:—Pine Grosbeak (*Corythus enucleator*), have seen several flocks in the streets of the city. Barred Owl (*Syrnium nebulosum*), very common. Mottled Owl (*Scops asio*), not uncommon. Snow Bunting (*Plectrophanes nivalis*), very common after a snow storm. Lapland Bunting (*Plectrophanes Lapponica*), not common. Snow Bird (*Fringilla Hudsonica*), common, in severe weather becoming half domesticated. Common Crossbill (*Loxia curvirostra*), common, though seldom seen out of the coniferous forests. White-winged Crossbill (*Loxia leucoptera*); this species, though often seen, is much rarer than the former. Cedar Bird (*Bombycilla Carolinensis*), not common. Lesser Redpoll (*Linaria minor*), abundant during autumn and winter. Downy Woodpecker (*Picus pubescens*), very common. Hairy Woodpecker (*Picus villosus*), not very abundant. White-breasted Nuthatch (*Sitta Carolinensis*), very abundant. Black-cap Tit (*Parus atricapillus*), the commonest of our winter birds. American Crow (*Corvus Americanus*), common. Blue Jay (*Corvus cristatus*), not common. Canada Jay (*Corvus Canadensis*), uncommon. Ruffed Grouse (*Tetrao umbellus*), common, but becoming rarer every year. Red-tailed Hawk (*Falco borealis*), common. Golden-eye Duck (*Anas clangula*), rare, I have seen but one individual this winter.—C. E. WILLIAMS, *Utica, N. Y.*

PREPARATION OF BIRDS' EGGS.—Allow me to suggest a method that I now invariably employ. Instead of the two holes to blow the egg by, I make one hole in the centre of the side of the egg, always selecting the side that is the least spotted, or the most, or as any particular fancy suggests. It should be made by an egg-drill, such as is furnished by the Smithsonian Institution, and at natural history stores. It is like a carpenter's countersink, only much finer. After making the hole, if the egg is fresh, draw the contents with a small glass syringe; if nearly hatched, draw such parts through the opening with a fine hook, made of a fine needle set in a handle, and cut as fast as drawn with a thin sharp pair of scissors. With the syringe all liquid may be drawn nicely. I drew last summer thirty crow blackbirds' eggs in as many minutes, and did not hurry either. Is there any objection to my method?—BALDWIN COOLIDGE, *Lawrence, Mass.*

ON THE EARLY STAGES OF BRACHIOPODS.—The writer made a visit to Eastport, Maine, early in the summer, for the purpose of discovering the early stages of a species of Brachiopod (*Terebratulina septentrionalis* Couth.) so abundant in those waters. As little has been known regarding the early stages of this class of animals the facts here presented will be of interest, as settling beyond a doubt their intimate relations with the Polyzoa. As the subject will be fully presented at the meeting of the American Association, only the more important features will be mentioned here. In a few individuals the ovaries were found partially filled with eggs. The eggs (Fig. 65) were kidney shaped, and resembled the statoblasts of *Fredericella*. No intermediate stages were seen between the eggs and the form represented in Fig. 66. This stage recalled in general proportions *Megerlia* or *Argiope* in being transversely oval, in having the hinge-margin wide and straight and in the large foramen.

Fig. 65. Fig. 66. Fig. 67. Fig. 68. Fig. 69. Fig. 70. Fig. 71.



Between this stage and the next the shell elongates until we have a form remarkably like *Lingula* (Fig. 67), having, like *Lingula*, a peduncle longer than the shell, by which it holds fast to the rock. It suggests also in its movements the nervously acting *Pedicellina*.

In this and the several succeeding stages, the mouth points directly backward (forward of authors), or, away from the peduncular end (Fig. 68), and is surrounded by a few ciliated cirri, which forcibly recall certain Polyzoa. The stomach and intestine form a simple chamber, alternating in their contractions and forcing the particles of food from one portion to the other. At this time also the brownish appearance of the walls of the stomach resembles the hepatic folds of the Polyzoa. Fig. 69 shows a more advanced stage, where a fold is seen on each side of the stomach; from this fold the complicated liver of the adult is developed, first, by a few diverticular appendages, as seen in Fig. 70.

When the animal is about one-eighth of an inch in length the lophophore begins to assume the horseshoe shaped form of *Pectinatella* and other high Polyzoa. The mouth at this stage (Fig. 70) begins to turn towards the dorsal valve (ventral of authors), and as the central lobes of the lophophore begin to develop, the lateral arms are deflected as in Fig. 71. In these stages an epistome is very marked, and it was noticed that the end of the intestine was held to the mantle by attachment, as in the adult, reminding one of the *funiculus* in the *Phylactolamata*. No traces of an anus were discovered, though many specimens were carefully exam-

ined under high powers for this purpose, the intestine of the adult being repeatedly ruptured under the compressor without showing any evidence of an anal aperture.—EDWARD S. MORSE.

SARCOPSYLLA (PULEX) PENETRANS.—Having had some personal acquaintance with the doings of this insect, allow me to make a few observations suggested by the account of it in the "Guide to the Study of Insects," p. 390. "The best preventatives (Webster gives *preventives*) against its attacks are cleanliness, and the constant wearing of shoes or slippers when in the house, and of boots when out of doors."

As I was not in the habit of going entirely barefooted, I cannot say whether I would have been more troubled by the *nigua* (Spanish)—or jigger (Florida), or chigoe or chique (French); *bicho* is applied to almost any sort of bug—than with shoes, or with shoes and stockings; and as I never wore boots I am not sure how much protection they would have afforded in either case. I imagined too that I was not unmindful of cleanliness—in general. By this it is not to be understood that I was not at times hardly presentable. I may even confess that I was sometimes dirty—yea, *very* dirty. I went into the woods, among the bushes and tall grasses often dripping with water. Sometimes I slid or rolled down the hills, or slipped up in the muddy roads. I had to climb trees,—yes, shin up them, and when wet too,—or miss the flowers in their very tops. I waded in ponds of very dirty water and in creeks clear as crystal, till my feet were soaked, even parboiled; yet the *niguas* *would* bore into them. More than once too they have penetrated my fingers, and I will not suffer the imputation that these were habitually unclean, which would be the inference from the confession that jiggers entered them, if it were a fact that uncleanness is favorable to their entrance. But the truth is that their *entrance* is due to their own instinct alone—their *continuance* there to neglect. It may be that they *take* more to some persons than to others, as vermin generally are said to do; though this, again, is attributed to uncleanness in the parties so affected. At all events it seems certain that some persons are less sensitive to these pests, or that they are less or not at all attacked by them. Some persons *say* that fleas do not get upon them. They may be of the hard-skinned sort.

The male "*nigua*" looks like a small flea, but does not jump, only runs. These may be often seen in places much frequented by swine particularly, and in the mills for hulling coffee, much like old-fashioned cider mills, the area of which is dry and trodden to dust by the oxen which draw the wheel. I have seen them also where a pet deer was accustomed to lie.

The female is rarely seen till felt. It is she alone that penetrates the skin. The male causes no annoyance. After traversing woods frequented by swine I have often had to extract some of the females on the following day, if I discovered their presence, which was not always the case. She enters the skin, vertically, just her own length. The tip

of the abdomen is always visible even with the surface. Thus respiration is carried on, I suppose. The sensation is a dull itching; and if the person is much occupied the entrance is very likely to be effected unperceived; at least, it was often so in my own case. Then a day or two may, perhaps, elapse before any considerable annoyance is felt. This consists of a tenderness about where the insect is, with an itching there or thereabouts. The nigua may be in the great toe, and you will rub or scratch the second or the third; or it may be in the bottom of the toe and the itching be felt at the root of the nail. This is one of the peculiarities of the irritation caused by this almost invisible pest. Another peculiar effect of the puncture, or lodgment, of the nigua is, that, after it is completely extracted the irritation continues the same for a day or two thereafter, especially if the part be scratched or rubbed. If now it be neglected very likely it may not be felt again till after several days, and when it has become nearly or quite gravid, when a slight soreness or a tenderness is sure to be experienced.

It is exceedingly rare that any ill-effect results from the extraction of a single nigua, or of a few, unless the party should be peculiarly predisposed to disease. The reason why the negroes are so much troubled by them is their own neglect, stupidity, laziness, or the toughness of the skin, or all combined. Their feet frequently are in a most disgusting condition, and the extirpation of the animals is not unattended with danger of ulceration, sometimes resulting in lockjaw. — CHARLES WRIGHT.

BIRDS' EGGS. — I will give a few hints taken from Mr. Wheelright and others. The utmost importance is to be placed upon the proper identification of the specimens. To every bird's leg attach a label noting sex (♀ for female, ♂ for male), date of capture and locality. Blow the eggs with a blow-pipe. Make but one hole and that on the side. Above the hole write the initials of the collector, and under it the number. (It is well also to put Baird's Smithsonian number on each). All the eggs in one nest should have the same number.

Suppose I take my first nest, Canada Jay, 15th March, with three eggs, I mark all three eggs, say No. 5, and keep a small note-book ruled thus :

Date.	Name.	No. on Eggs.	Remarks.
March 15.	Canada Jay, 3 eggs.	5	Taken by myself (or as the case may be) out of a small spruce, six feet from the ground. Old bird shot. (Describe the nest, and any and all particulars.)
April 30.	Gos-hawk, 3 eggs.	6	Taken, etc.

A printed label, with the name of the bird, looks very neatly. In the case of small birds always preserve the nests, as they are often more interesting and valuable than the eggs themselves. All the eggs of the same nest, and the nest, being numbered the same, by a reference to the little note-book the identification of any eggs (even if they get mixed) is very easy, and the history of any specimen can be ascertained. If an egg has

been sat on very long this will be found a good process to clean out the embryo: Make a little larger hole than usual in the side, pick out as much of the young bird as you safely can, and then blow water into the egg with a blow-pipe; let it stand for some days in a dark drawer or box; keep repeating this process about every third day, gradually blowing more water into the shell, and picking a little out, till the whole of the embryo has decayed and is removed. This is a safe and sure way for a rare and valuable egg. I often put large eggs where the Cabinet-bug (*Dermestes*) can get into them, and clean out any foreign matter adhering to the shell.—G. A. BOARDMAN.

HABITS OF EARTHWORMS.*—Last spring (and this) I was led to watch the common earthworms in my garden, and on the plot of grass saw their manner of feeding. I was within ten inches of their bodies. I saw one prepare to feed on a young clover leaf from a clover stock; he kept his tail secured to the hole (as a base line) in the ground, by which he retreated quicker than the eye could follow him. Finding all quiet he came again. Within a few inches of my eye the pointed head of the worm changed, and the end was as if cut off square. I then saw it was a mouth. He approached the leaf, and by a strong and rapid muscular action of the rings of the whole body drew the leaf and one inch of the tender stock into his mouth, and then by a violent muscular action drew the whole stock of young and tender clover towards him, and when all the substance was sucked out he let the plant go and it (the stock) flew back to its former place. The leaf and stem were entire, but looked as though it had been boiled. I then laid a small piece of cold mutton down, and he appeared to feast both on the fat and lean, dragging them after him, as his powers of suction could not act as well as if they had been held like the clover leaf. I also find that when the male and female are together they appear as one worm of double the size.—R. P. KNIGHT, *Philadelphia*.

HONEY BEE KILLED BY ASCLEPIAS POLLEN.—I found *Bidens frondosa* in Morris County, N. J., in the summer of 1867, constantly with petals. In the same summer, in continuation of my observations on the manner of fertilization of Asclepiads, I repeatedly found honey bees entangled, or rather entrapped by the glands. I found them dead; starved to death. I suppose, or exhausted with their efforts to escape. At other times they either got free themselves or with a little help. I found them most abundantly in the neighborhood of Peekskill, N. Y., being much assisted in my search by Rev. Mr. Morris, and his brothers, of Lake Mohegan. No insect of any size was found thus entrapped, and only a very few small diptera, which I looked upon as interlopers, or accidents. The bee having the pollen mass on his leg alights on the flower, and as he draws his leg up, in reaching over to the other side, brings the blade of the pollen mass into the stigmatic cleft, where it adheres, separating from the stalk, which still remains attached to the insect's leg. This

* Communicated by the Smithsonian Institution.

stalk then catches in the groove of the gland, and draws out a new set of pollinia. Passing to a new flower (or another part of the same perhaps) the same process is renewed, and I have found strings of the glands and shafts thus attached to each other, particularly on the old flowers of *A. incarnata*. On one occasion I caught an insect, on *A. incarnata* I believe, which had drawn out the pollen of this species by means of the shaft of *A. purpurescens*. At that time I had not a set of the various pollinia to compare the two with, and I sent the specimen to that enthusiastic botanist, W. W. Denslow, who had made a set, and he verified my supposition. This incident would show that the same insect had within a short time visited more than one species of *Asclepias*. Do insects visit flowers promiscuously, or do they, as one guest, confine themselves to one species? I have watched honey bees on a bed of hyacinths and thought that the same set confined themselves to the same color. Is there any rule in the matter? My lamented friend, W. W. Denslow, was engaged with me in working up the subject of the fertilization of *Asclepiads* by insects, when death cut short his studies. I had urged him to write to you on the subject but he had points which he wished first to settle, particularly how the hair of the insect is held in the gland of the stigma.—W. H. LEGGETT, *New York*.

ANOTHER DOUBLE EGG.—A short time since I visited a family, the lady of which had broken a number of eggs to fry for breakfast a few moments before I had arrived, and in the inside of one of the eggs was a small, perfectly formed egg, about the size of a pigeon's egg, which was given to me, and which I now have. I removed the contents, consisting of albumen alone. The egg from which it was taken contained the usual contents, white and yolk.—R. L. WALKER, M. D., *Penn.*

Six cases of double eggs are noticed on page 50 (Vol. ii) of the NATURALIST.—EDS.

THE KINGFISHER IN WINTER.—I noticed this day (December 11, 1868), about noon, a kingfisher perched on a tree, making his usual wild notes, and looking for his game; below him was a small stream, a spring which does not freeze over in the coldest weather and in which fish can be seen. The day mentioned was very cold, 20° below zero. I had supposed that those birds went to the South long before this. Can they endure our Northern cold weather? Where do they keep themselves in our very cold nights?—HENRY DAVIS, *Houston County, Minn.*

A few kingfishers remain all winter in New England.—EDS.

EXTERNALLY AND INTERNALLY PARASITIC ACARI.—M. Guérin Méneville notes, in a letter to the French Academy, the sudden appearance of innumerable acari (*Tyroglyphus feculentus*) on his potatoes. In less than eight days these little arachnidans became so abundant as entirely to cover the potatoes, and form a seething mass. He is at a loss to account for their remarkable and sudden appearance.

Mr. Charles Robertson, Demonstrator of Anatomy in the University of Oxford, has lately described a form of acarus found inside pigeons, chiefly

amongst the connective tissue of the skin, the large veins near the heart, and on the surface of the pericardium. In some respects the acarus described agrees with *Sarcoptes*, but has an extraordinary maggot-like appearance. The discovery of an external parasite inside an animal, in such numbers as Mr. Robertson records, is very remarkable. Colonel Montague found such acari in the gannet, and Mr. Robertson has since found them in the pelican. It is exceedingly difficult to account for their appearance. Are they undergoing a normal phase of their existence, or have they been accidentally introduced in the cases recorded, and found the habitat a favorable one?—*Quarterly Journal of Science, London.*

ORNITHOLOGICAL.—In the September (1868) NATURALIST Mr. Kedzie gives an instance of the "breeding peculiarities" of the Golden-winged Woodpecker (*Colaptes auratus*), in which he states that he obtained thirty-three eggs from one of their nests, and calls upon any of the readers of the NATURALIST to surpass it.

In the spring of 1865, while in Maryland, I obtained twenty-two eggs from the nest of our common House Wren (*Troglodytes edon*), and doubtless would have got more had not the nest been broken up. Mr. George Hensel, taxidermist of this city, also informs me that he once obtained twenty-eight eggs from the nest of a Kingbird (*Tyrannus Carolinensis*). Although the number of eggs obtained in the two cases mentioned are not equal to those got by Mr. Kedzie, yet considering the size of the different birds I think that I am a little ahead of him.

Last spring, while in Florida, I found the Bluebird (*Sialia Sialis*) breeding there. Can any of our ornithologists inform me whether it has ever been found breeding so far South before?—C. H. NAUMAN, Lancaster, Pa.

REGENERATION OF LIMBS.—M. Milne-Edwards has communicated to the French Academy some new results of M. Philippeaux's experiments on the subject of the regeneration of limbs. The author's early experiments made on reptiles prove that if the limbs of a newt be cut off, the scapula or ilium being left behind, the limbs will be reproduced, but that if the scapula is removed the limb is never reproduced. He has now been experimenting on fishes, and has proved that this is true. If the fin-rays of a fish be cut off they will be reproduced; but if the part which is homologous with the scapula be removed, no reproduction will take place.—*Scientific Opinion.*

THE MARYLAND MARMOT (*Arctomys monax* Gmel.), more popularly known in this locality by the common name of "Groundhog," is still tolerably abundant in the southern districts of Lancaster County, Pa.; but I never knew they were so prolific, at least I have seen nothing on record that indicates anything like the fecundity of a female specimen captured in Drumore Township, on the 24th of April last. This subject, before she was killed, brought forth five naked cubs, and afterwards our taxidermist found that her matrix contained six more, making eleven. These young were all entirely nude—not a particle of hair on any of them—and a sort of film over their eyes. They may have been prema-

turely brought forth through the excitement incidental to capture, as these animals are usually very shy, going abroad mainly during the night. A curious fact in reference to these young marmots is, that one of them was immersed in cold water for two hours without destroying life. They were fully three inches in length, and I should judge from their size, weighed about an ounce and a half. — S. S. RATHVON, *Laurel, Pa.*

THE SALT LAKE EPHYDRA. — In the April number of "Hardwicke's Science-Gossip," is figured an "animal from Salt Lake," which the correspondent and editor seem unable to identify. It is undoubtedly the larva of Ephedra, of which the fly and puparium have been figured in the NATURALIST, Vol. II, p. 278, and a short account given of the occurrence of other species in the salt-works in Germany, the Equality salt-works, Gallatin County, Illinois, the salt Lake Mono, California, and the coast of Labrador and Massachusetts, where it lives in salt or brackish water. — A. S. P.

THE SPIDER AND MUD-WASP. — Mr. Thomas Affleck, of Ingleside, Mississippi, in a letter to the late Dr. T. W. Harris, dated July 20th. 1848, and preserved in the Library of the Boston Society of Natural History, relates the following curious incident: — I noticed a singular incident the other day, confirming a strange fact (to me) in the insect world. A very large spider was attacked by one of the small blue mud-wasps, or dirt-daubers, not half its size, and on the ground. The spider seemed much alarmed, and managed to fend off his antagonist and escaped at a rapid pace, doubling and winding. The wasp seemed to have lost him for several seconds, but presently it circled round like a well-trained fox-hound, and on striking the trail ran it closely through all the doublings and windings of the spider, overtaking and attacking him again. This was repeated two or three times, the wasp clearly trailing the spider, as a hound would a fox. At length he succeeded in stopping the spider, when a capital fight ensued, lasting at least a minute. The spider had no chance with his enemy, who soon stung him to death, losing a leg only during the fight. After resting a few moments the wasp circled around again, evidently selecting a smooth path, along which he dragged with much difficulty his bulky prey. The moment he met with an impediment, dropping the spider, he circled round again, and invariably chose a smooth path. Where did instinct cease, and reason begin here? Were you aware that insects followed a trail, from the scent, in this way?

VARIATION OF BLUEBIRDS' EGGS. — I found on the 17th of May a nest of eggs so peculiar that I wish you to know of them. I was hunting east of here when I saw a bluebird enter a small hole in an old stump. I noted her carefully, and also recognized a male near by. When I found my hand would not enter, and that the bird would not come out, I pushed the stump over, tearing away a part, and not till then did the bird come out. I am certain that it was a female bluebird, but every one of the five eggs was pure white. I also noticed that, unlike the woodpecker's, the bottom of the cavity was well bedded with grass; strictly a bluebird's

nest. The eggs were nearly ready to hatch, and I could not save but four, poor specimens. I examined the embryos, however, carefully, and they had the bill and feet of a *Sialia*. It is a variation entirely new to me, although I have seen hundreds of bluebirds' eggs. I have no doubt whatever of its identity.

I also have another egg in my collection which is a nondescript. It is $1\frac{3}{16}$ inches long, of a very light bluish-green, sprinkled all over with grains of light brown and many other obscure specks; globular. It was in a crow-blackbird's nest, which had besides its full complement of eggs, in a small swamp near Munroe, Michigan. That was in 1867, and though I have searched many blackbirds' nests since I have seen nothing like it, nor can I find any one who has ever seen such. There was but the one. I am confident that it is a parasitic egg, though manifestly not a cow-bunting's. — ERNEST INGERSOLL, Oberlin, Ohio.

GEOLOGY.

NEW SPECIES OF FOSSIL HORSE IN MEXICO.—Prof. R. Owen has described the teeth belonging to an extinct horse, found in the newer Tertiary deposits of the valley of Mexico. "It is unlikely, seeing the avidity with which the Indians of the Pampas have seized and subjugated the stray descendants of the European horses, introduced by the Spanish 'Conquestadors' of South America, and the able use the nomad natives make of the multitudinous progeny of those war horses at the present day, that any such tamable equine should have been killed off or extirpated by the ancestors of the South American aborigines." Owen also doubts whether the fossil contemporaries of this horse (*Equus conversidens*), and its allies, the *Equus Tau* Owen (from the same locality), and *Equus curvidens*, etc., and also the Megatherium, Mylodon, Toxodon, Nesodon, Macrauchenia, Glyptodon, and Mastodon, were rendered extinct by human means. — *Scientific Opinion*, London.

ANSWERS TO CORRESPONDENTS.

F. W. G., Newburg, N. Y.—The galls from the rose are probably those of *Cynips bicolor* Harris. They were each tenanted by the larva of a Chalcid parasite.

ERRATA.

Page 215, line 14 from below, for *arms*, read *arcus*. Page 216, line 25 from below, for *operculata*, read *opercula*; line 12 from below, read *between* November 18, and December 11; line 12 from below, for *Lindquist's*, read *Lindqvist*. Page 217, line 25 from below, for *Durir*, read *Duner*, and for *Nordenskjold*, read *Nordenskjöld*; line 7 from below for "It," read *the Nova Acta Regia Societatis Scientiarum Upsaliensis* (Ser. 3^{tie}, vol. vi). Page 219, line 3 from above, for *Törnkríst* read *Törnkræist*; line 5 from above, for *Sparagmitis*, read *Sparagmitic*; line 16 from above, for *geodesical*, read *floral* or *floristical*. Page 220, line 23 from below, for *frondée*, read *trouvée*, for *Ballinoptère*, read *Baleinoptère*; line 15, from below, for *a Mulmo Whale*, read *Mulms' Whale*; line 10, for *last*, read *lost*; line 6, for *F'hjelt*, read *Hjelt*. Page 221, line 6 from above, for *viridula*, read *viridula*.

